

CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.

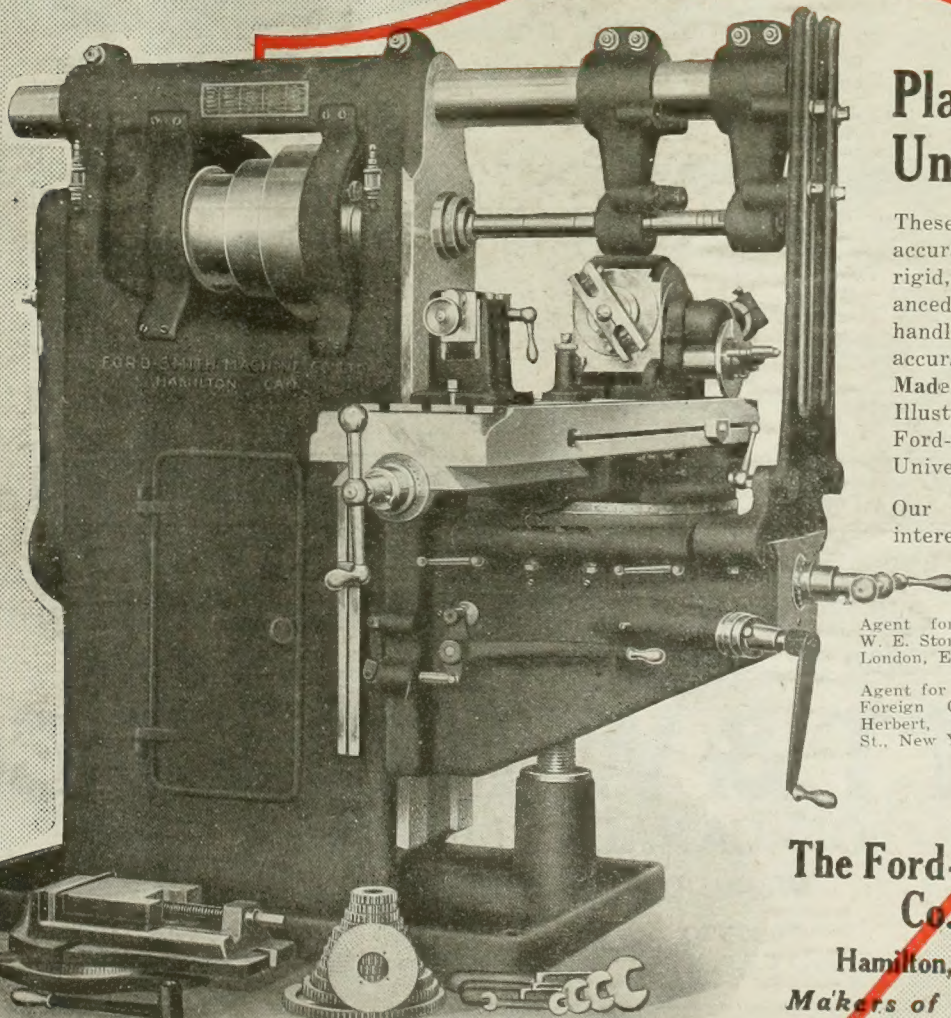
Published by the MacLean Publishing Company, Limited, Toronto, Canada.

Vol. XXI. No. 14.

Publication Office: Toronto, April 3rd, 1919

Subscription Price
\$3.00 per Year

FORD-SMITH MILLING MACHINES



Plain and Universal

These machines are accurate, strong and rigid, with well-balanced design to handle rapid and accurate production. Made in four sizes. Illustration shows Ford-Smith No. 3 Universal.

Our catalogue will interest you.

Agent for Great Britain:
W. E. Storey, 3 Arundel St.,
London, Eng.

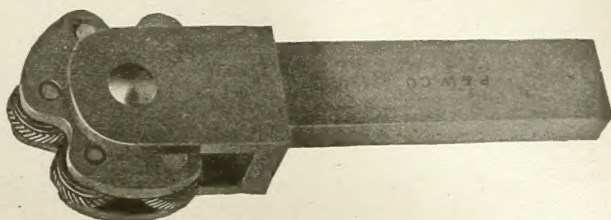
Agent for United States and
Foreign Countries: Alfred
Herbert, Limited, 54 Dey
St., New York.

**The Ford-Smith Machine
Co., Limited**

Hamilton, Ontario, Canada
*Makers of Milling Machines
Grinders and Special Machinery*

SMALL TOOLS

P. & W. Combination Lathe Knurling Tool



PROMPT SERVICE

is assured at our present
store where P. W. Small
Tools are carried in stock.
Place your order there
to-day.

Combines Three Distinct Knurling Tools in One

You will save time by using this three-
in-one Lathe Knurling Tool.

It carries
three pitches
of knurls
fine, medium



Fine Medium Coarse

and coarse, as shown in sample. This
does away with necessity of having
three holders or of changing knurls
where but one holder is available. Same
knurls can be used in this holder as are
used in our regular Lathe Knurling
Tool.



Regular Lathe Knurling Tool

Precision Machine Tool---Standards & Gauges

PRATT & WHITNEY CO.

OF CANADA, LIMITED

Works: DUNDAS, ONTARIO

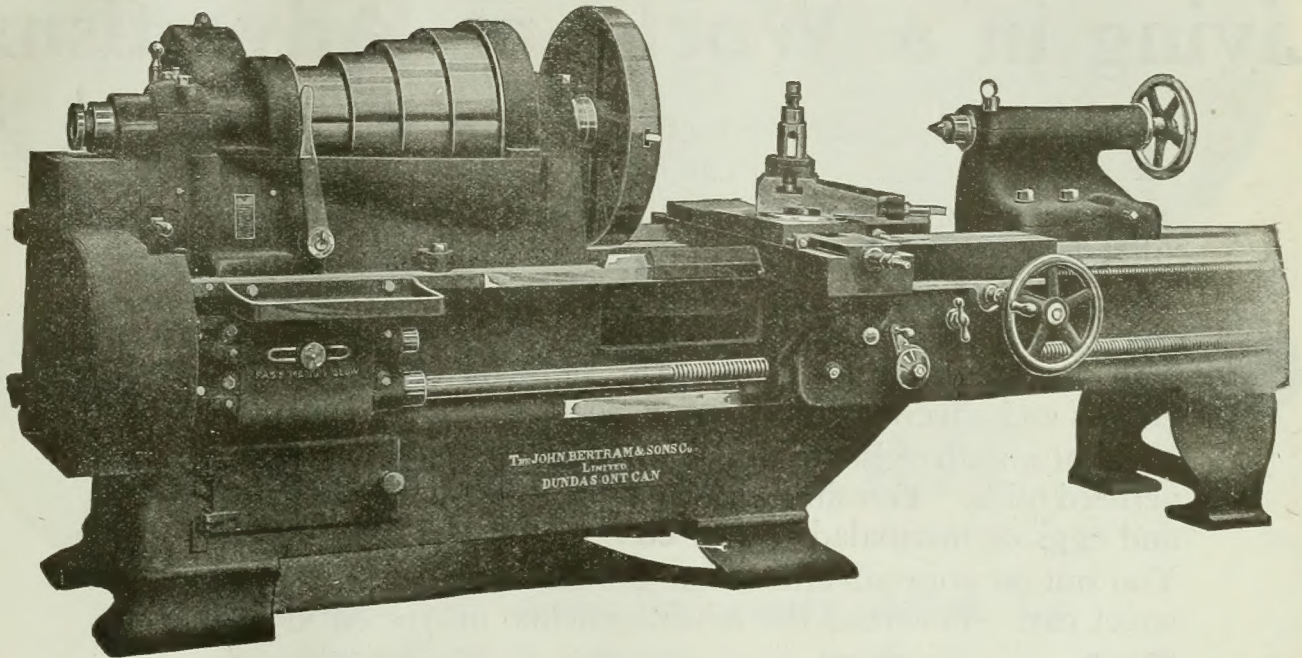
MONTREAL
723 Drummond Bldg.

TORONTO
1002 C.P.R. Bldg.

WINNIPEG
1205 McArthur Bldg.

VANCOUVER
B.C. Equipment Co.

BERTRAM MACHINE TOOLS



Double Back Geared Gap Lathe 26-inch x 42-inch Swing

Bertram Machine Tools are built for safety and service, and are backed by a concern with sixty years' experience and the largest of its kind in Canada.

The John Bertram & Sons, Co., Limited

MISCELLANEOUS DEPARTMENT

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The Publisher's Page

TORONTO

APRIL 3, 1919

Living in a World of Advertising

THINK of a good product to-day and you think of an advertised product. You can't get away from it.

Advertising enters into your daily life far more than you realize and "there's a reason."

You awake in the morning to the tune of an advertised alarm clock. You lather your face with an advertised soap and brush. You shave with an advertised razor. You dress in advertised clothes and advertised underwear, socks and shoes.

You eat an advertised orange, an advertised cereal served with advertised milk. You finish off your breakfast with advertised bacon and eggs or marmalade and a cup of advertised tea or coffee.

You put on your advertised hat and make a rush for an advertised street car. You read the advertisements in an advertised newspaper.

Your work throughout the day brings you in contact with advertised lines. You are probably engaged in the manufacture of an advertised product.

If you go to the theatre or movies it is to see an advertised show.

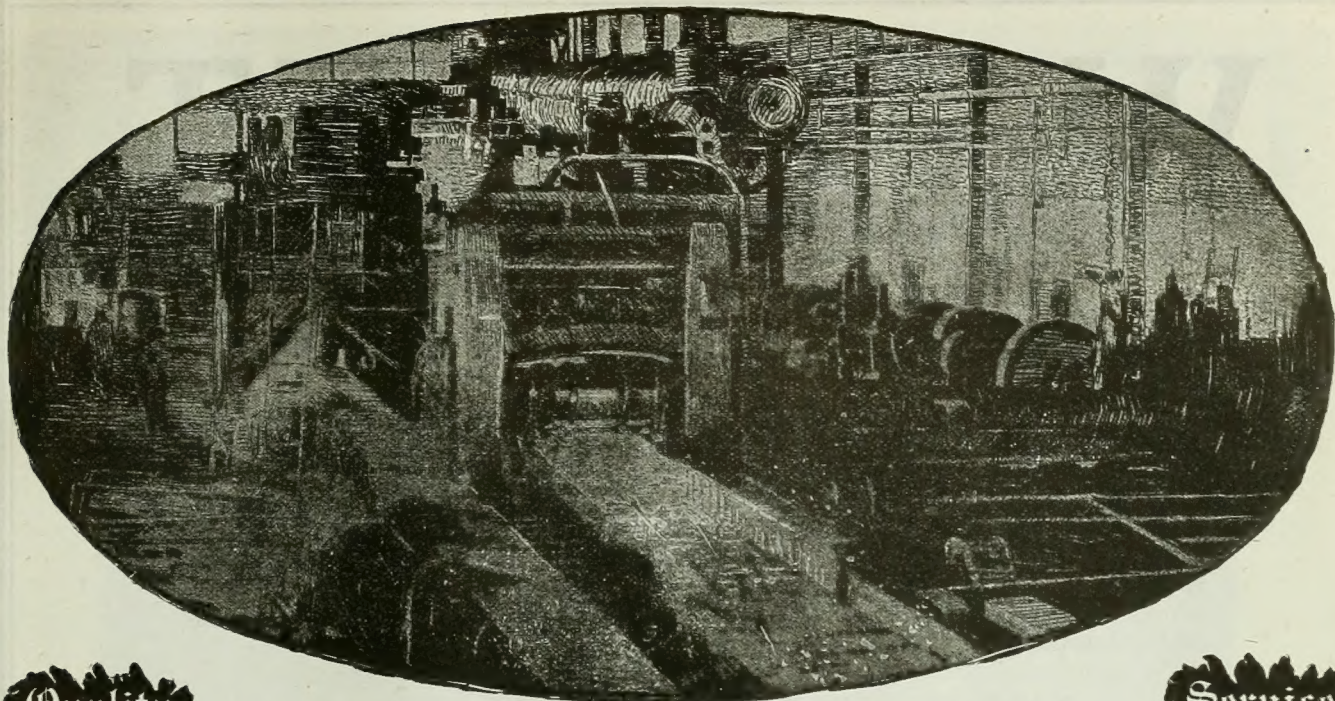
You smoke advertised tobacco and cigars. You listen to the music of an advertised piano in your home or to the advertised records played by an advertised phonograph.

Finally you lay your tired head on an advertised pillow and your body on an advertised mattress, your wife meantime reading the bargain day advertisements in the evening paper when she should be turning out the (advertised) light.

About the only thing that enters into your life that is not advertised is sleep and it will never need advertising because the supply will never equal the demand.

There is, as we said before, a reason why you eat and use and wear and buy advertised products. It is because they are good. And it shows you have good judgment when you buy advertised lines.

A poor product cannot be continuously advertised. A good product can.



Quality

Service

REASON IT OUT

Demand full value for every dollar by
spending it where you earn it

PURCHASE THE PRODUCTS OF CANADIAN MILLS

A Canadian Dollar is Worth
One Hundred Cents in Canada

THE
STEEL COMPANY
OF
CANADA

LIMITED

HAMILTON

MONTREAL

WALCOTT

The Lathe for Continuous Duty

Hundreds of Canadian shops were working night and day to keep up with the demands of war. This continuous service put a heavy strain upon the machines used. These machines were of quality construction and modern design that stood the strain and gave economical and efficient service. Such is the WALCOTT LATHE. Here is a tool not just built for war purposes; it is a tool that will give you the best of service in peace time as well as war time. And in the WALCOTT you see a lathe with a price as low as possible, compatible with the cost of production.

WALCOTT LATHES are in demand, but our increased facilities put us in a position to supply all Canadian requirements.

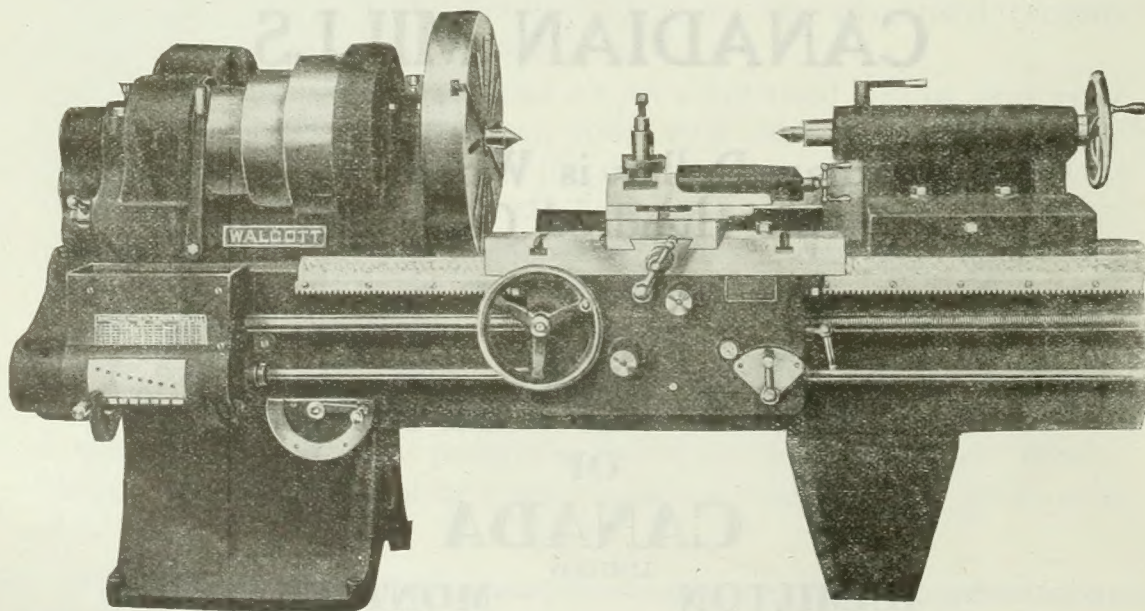
WALCOTT LATHE COMPANY

Engine Lathes

140 Calhoun Street

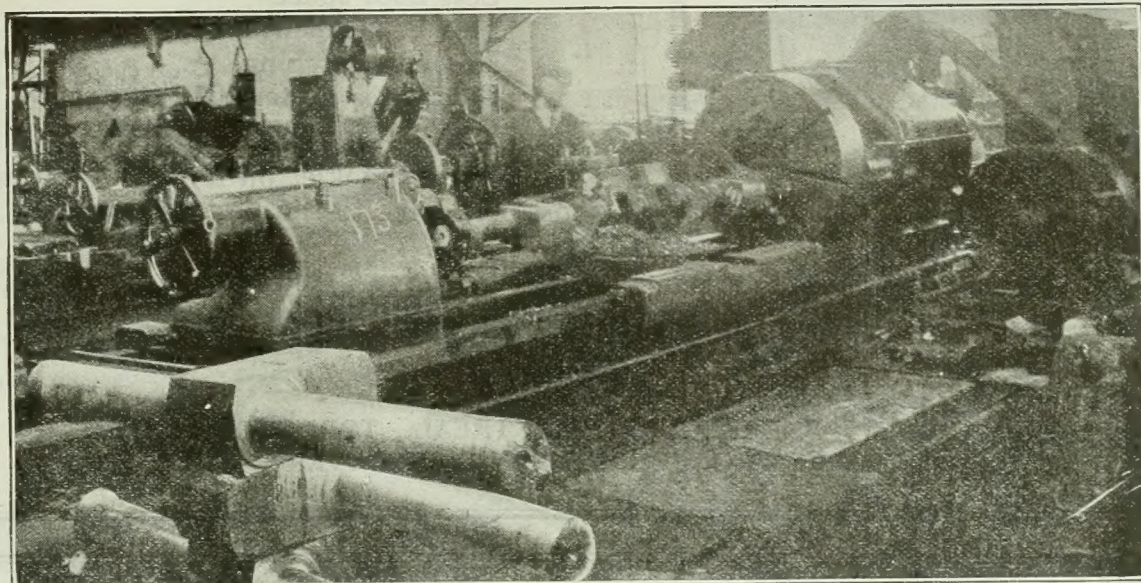
JACKSON, MICHIGAN

AGENTS:—Hill, Clarke & Co., Chicago, Ill. Frevert Machinery Co., New York City, N.Y. W. E. Shipley Machy. Co., Philadelphia, Pa. National Supply Co., Toledo, Ohio. Motch & Merryweather Machinery Co., Pittsburgh. H. A. Smith Machinery Co., Syracuse, N.Y. Wm. E. Duff, York, Pa. Wm. E. Duff, Jacksonville, Fla. Brown-McDonald Machy. Co., St. Louis, Mo. Smith-Booth-Usher Co., Los Angeles, Calif. Hendrie-Bolthoff Mfg. & Sup. Co., Denver, Col. Gordon & Finkbeiner, Portland, Ore. Northern Machinery Co., Minneapolis, Minn. Brownell Machinery Co., Providence, R.I. Chas. A. Strelinger Co., Detroit, Mich. Marshall & Huschart Machinery Co., Indianapolis, Ind. Fenwick, Freres & Co., Paris, France. Buck & Hickman, Ltd., London, England. Parke & Lacey Co., Sydney, N.S.W. Standard Machy. & Supplies, Ltd., Montreal, Que. Canadian Fairbanks-Morse Co., Ltd., Toronto, Ont.



BRIDGEFORD

Heavy Duty Lathes



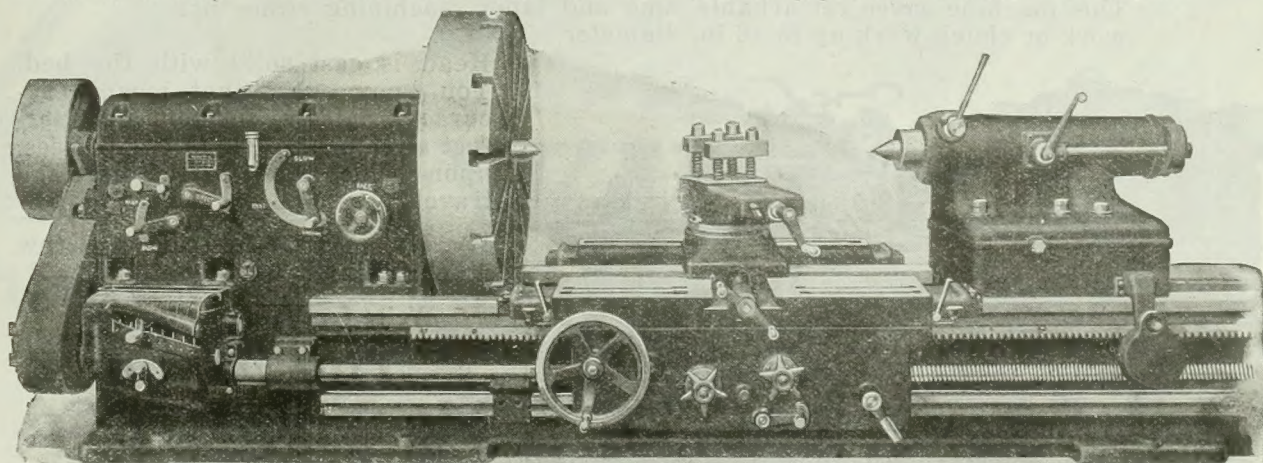
Rough turning pins on crankshafts of nickel steel was the duty assigned to this 42-in. Bridgeford Heavy Lathe in the shop of the Erie Forge Company, Erie, Pa. The rough size is approximately 6 in. in diameter and the finished size 5 in. in diameter. Eight pins is an average day's output on this efficient lathe.

Bridgeford Heavy Duty Lathes are in operation in all parts of the world on all kinds of duty. That their work is uniform-

ly satisfactory is evidenced by the number of repeat orders from shops that started with one Bridgeford as a "tryout." One well-known plant has 200 Bridgefords and there are many others entirely "Bridgefordized."

Bridgeford Heavy Duty Lathes range in size from 24-in. to 72-in. swing.

Facts speak louder than mere words. Let us prove by facts and figures why Bridgeford Lathes are standard equipment in the leading industrial plants.

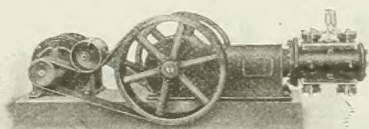


BRIDGEFORD MACHINE TOOL WORKS

151 Winton Road, Rochester, N.Y.

Manufacturers of Heavy Duty Lathes for more than 20 years

The Short Belt Drive For Compressors Saves Space



Have you been wondering how you can fit that compressor into your power house? Here is the solution—the short-belt drive.

We build both single-stage and two-stage machines—straight-line and duplex with this type of drive.

**Less floor space
Less belt expense
No belt stretching
Capacities up to 2,000 ft. per
min. with short-belt drive.**

Send for our booklet on how to apply the short-belt drive to the best advantage.

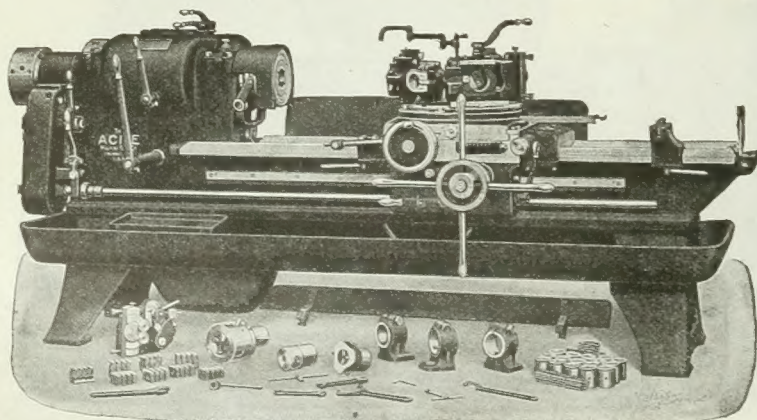
**Canadian Ingersoll-Rand Company
Limited**

SYDNEY, SHERBROOKE, MONTREAL, TORONTO
COBALT, WINNIPEG, NELSON, VANCOUVER

Doubly Efficient—Does Both Bar and Chuck Work

This Cincinnati Acme Flat Turret Lathe is a double-production, geared head machine of the sliding gear type. It operates on minimum power because the only gears running are those doing the actual work.

This machine saves remarkable time and labor machining either bar work or chuck work up to 16 in. diameter.



3 1/4 in. x 36 in. Flat Turret Lathe Equipped for Bar Work.

Head is cast solid with the bed. You know what that means: accuracy, rigidity, constant and perfect alignment of spindle with vees, upon which the turret carriage travels.

We also make a full line of Screw Machines and Turret Lathes.

Write for Valuable Bulletin

**The Acme'
Machine Tool Co.**
Cincinnati, Ohio

Canadian Agents: Rudel-Belnap Machinery Co., of Montreal and Toronto

SPEED • ACCURACY

Chemistry the Keynote of Tool Efficiency

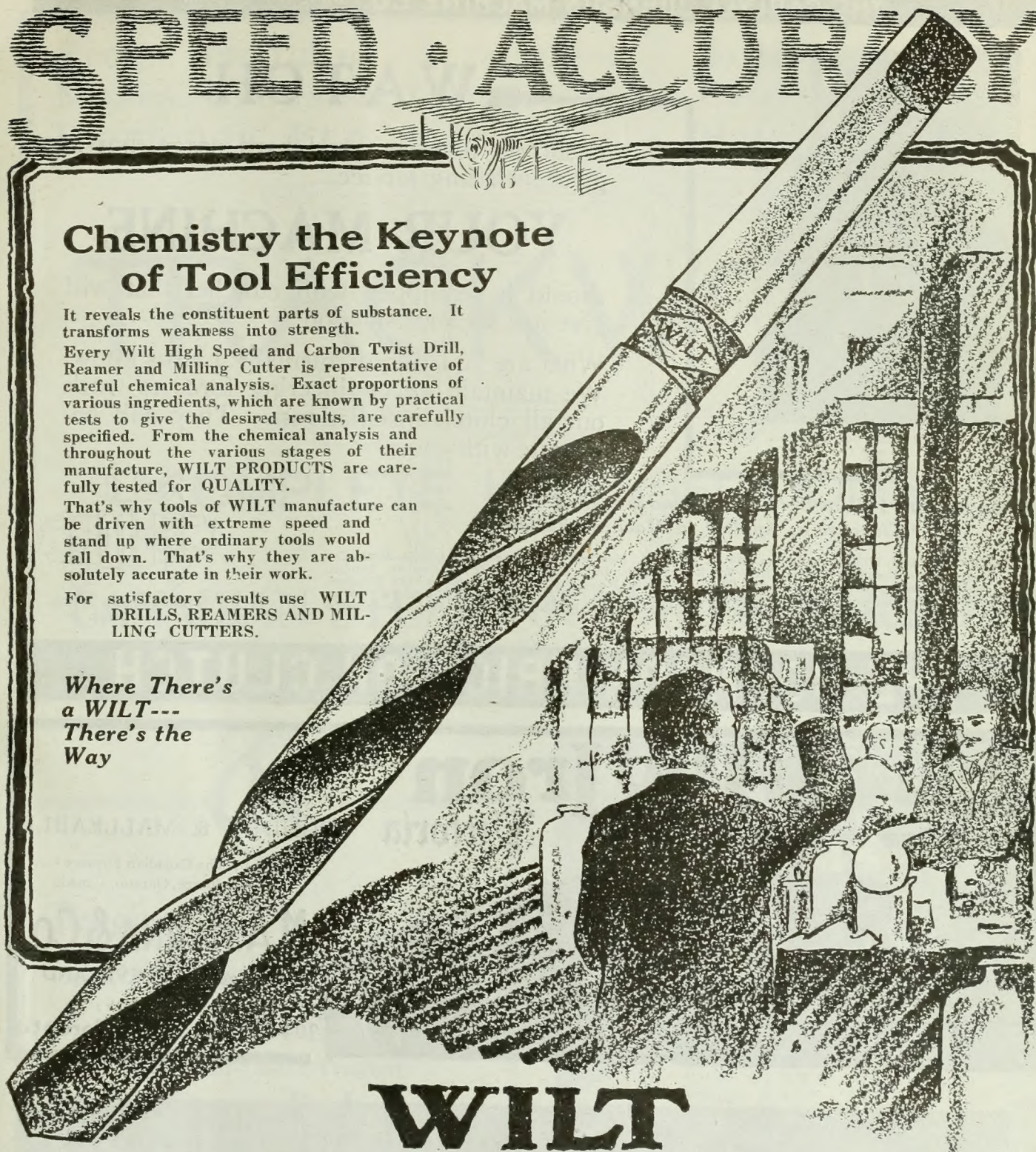
It reveals the constituent parts of substance. It transforms weakness into strength.

Every Wilt High Speed and Carbon Twist Drill, Reamer and Milling Cutter is representative of careful chemical analysis. Exact proportions of various ingredients, which are known by practical tests to give the desired results, are carefully specified. From the chemical analysis and throughout the various stages of their manufacture, WILT PRODUCTS are carefully tested for QUALITY.

That's why tools of WILT manufacture can be driven with extreme speed and stand up where ordinary tools would fall down. That's why they are absolutely accurate in their work.

For satisfactory results use WILT DRILLS, REAMERS AND MILLING CUTTERS.

*Where There's
a WILT---
There's the
Way*



WILT

HIGH SPEED AND CARBON TWIST DRILLS, REAMERS AND MILLING CUTTERS

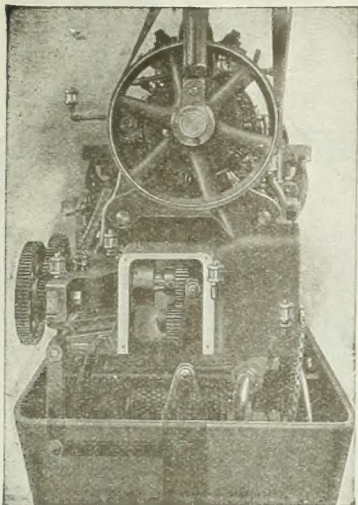
Manufactured by the

WILT TWIST DRILL CO.

Walkerville OF CANADA LIMITED  **Ontario**

London Office: Wilt Twist Drill Agency, Moorgate Hall, Finsbury Pavement, LONDON, E.C. 2 ENG.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.



Courtesy National Acme Co., Cleveland, Ohio.

WATCH

is subject to exceptional hard usage, but it gives unfailing service.

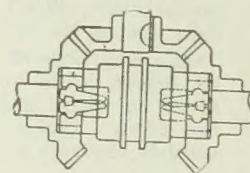
YOUR MACHINE

should be equipped with clutches that will give just such satisfaction.

What are your requirements? Let us know. We maintain an engineering force to work out all clutch installations. They will co-operate with you.

Write for our Yellow Data Sheets and Booklet,
"Clutches as Applied in Machine Building"

AGENTS: CANADA—Williams & Wilson, 320 St. James St., Montreal; The Canadian Fairbanks-Morse Co., Ltd., Montreal and Branches. ENGLAND—The Efundem Co., Ltd., 22 Newman St., Oxford St., London, W. 1, Sole Agents for British Isles. AUSTRALIA—Edwin Wood Pty., Hdwe. Chambers, 231 Elizabeth Street, Melbourne, Victoria. JAPAN—Andrews & George Co., 10 Takegawacho, Kiobashiku, Tokyo. SOUTH AFRICA—D. Drury & Co., Main Street, Johannesburg. FRANCE—Anciens Etab. Glaenger & Perreaud, 18 Fauborg du Temple, Paris.



Double Clutch in Nest of Gears.

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Coal
Coke
Iron Ore

Pig Iron

Victoria

FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada

M.A. HANNA & CO.

Sales Agents, CLEVELAND

Canadian Office:
904 C.P.R. Bldg., Toronto

FIRTH'S

Speedicut ^{HIGH SPEED} Steel

Insures Maximum Production

FIRTH'S CARBON TOOL STEELS

Standard Brands

Highest Quality

THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES | 449 St. Paul St. West, MONTREAL
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J. A. SHERWOOD
Canadian Manager

Frogs, Switches
Mates, Crosses
Diamonds, Etc.

*For Steam
& Electric
Railways.*

Built-up, Hard-
Centre or Solid
Manganese-Steel



TRACKWORK

COMPLETE INTERSECTIONS

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Transportation Building, Montreal



Forging Billets and Bars
Electric Furnace, Alloy Steels
Die Blocks

Annealed—Heat Treated

Piston Rods

Rough Turned—Annealed—Heat
Treated

High Speed Steel

General Steel Company

Milwaukee, Wisconsin
DETROIT—823 Dime Bank Building

**Swedish Steel & Importing
Co., Limited**

Montreal
New York

Toronto
Denver

Direct representa-
tives of foremost
Swedish mills;
makers of

Tool Steels

ALLOY STEELS, BILLETS,
BARS, DISCS, SHEETS,
HIGH SPEED STEELS,
DRILL RODS, DRAWN
BARS, SEAMLESS TUB-
ING, COLD ROLLED STRIP
STEEL, WELDING WIRE,
WROUGHT AND ROLLED
IRON, PIG IRON, STEEL
AND IRON ENDS, HOL-
LOW AND SOLID MINING
DRILL STEEL.

TRADE MARK



PROMPT SHIPMENTS
from large stock



BRIGGS

MILLER

Breaking Production Records

Forcing the feed on the "BRIGGS" to an extent impossible on any other machine.

THE photograph shows twelve belt lacer jaws clamped together on the table of a Briggs Milling Machine, where two straddle-mounted cutters mill the channels at one setting, though the stock is cold rolled steel, one inch thick. 15 minutes completes the operation, this speed being attained by forcing the feed to an extent impossible with any other milling machine. There is no chatter—the surface is "finished" when it comes from the machine.

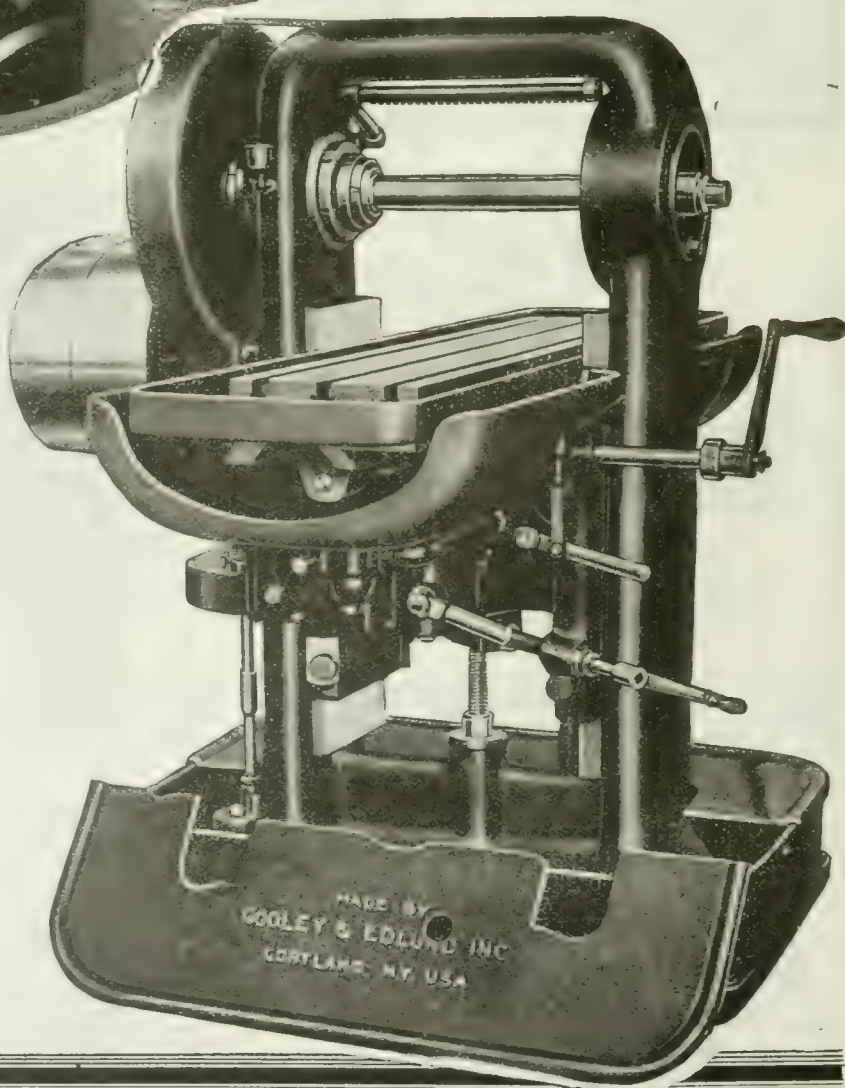
Rigid, powerful and easy to operate. Takes wide, deep cuts without showing least signs of distress, and will produce accurate work when running at a high rate of speed.

Gooley & Edlund, Inc.

Cortland, N.Y., U.S.A.

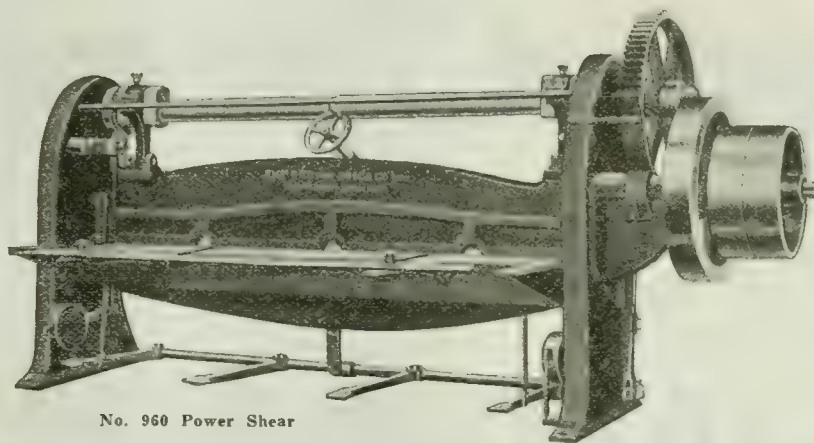
Williams & Wilson, Ltd., Montreal

FOREIGN AGENTS: Allied Machinery Company of America, France, Belgium, Italy, Switzerland, Russia, Scandinavia and Barcelona, C. W. Barton Griffiths & Co., London, Manchester and Glasgow; Andrews & George Co., Tokyo, Japan.

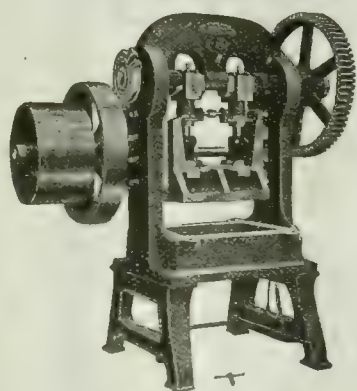




Stood The Test



No. 960 Power Shear



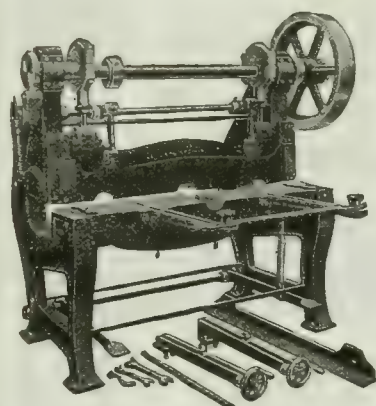
No. 20½ Power Press

"B.B." Tools during the last four years have proven their superiority under the most trying conditions.

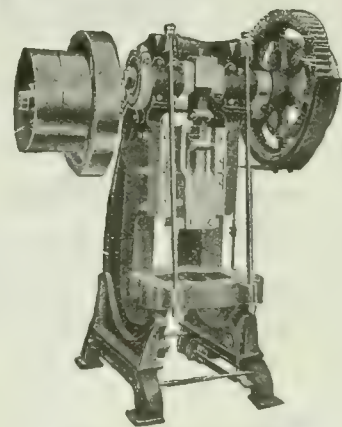
Inexperienced help and 24 hours' daily service will test the best machines.

Quality that is "*built in*" on a machine is bound to assert itself under such circumstances.

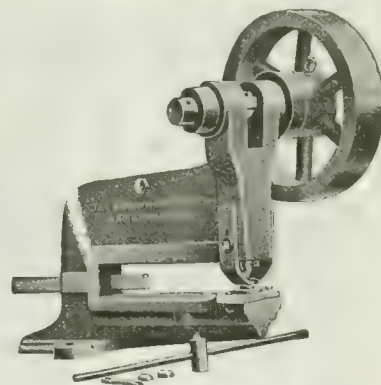
Our line comprises shears of all kinds, power presses for punching, forming, embossing, blanking, etc. Tin-smith's tools and sheet metal working machines of every description, also canners' and evaporators' machinery.



No. 404 Shear



No. 215 Power Press



No. 100 Power Punch



The Brown-Boggs Co., Limited
Hamilton, Canada



BRITAIN'S BEST

KE

BRANDS OF ALLOY & TOOL STEELS

In Billets, Bars, Sheets, Hot and
Cold Rolled Strips, Cold Drawn
Cast Steel, Wire and Drill Rods
HIGH GRADE STEEL FOR ALL PURPOSES



Principal Trade Marks

KAYSER ELLISON & CO LTD

ESTABLISHED 1825

Complete Stock

SHEFFIELD, ENG.

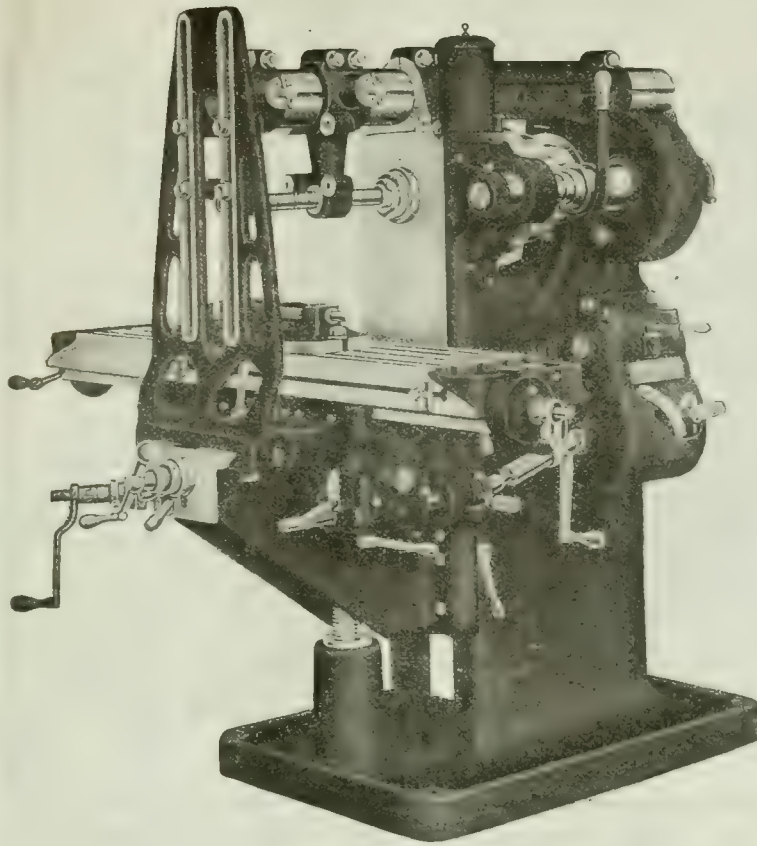
Montreal Warehouse

RALPH B. NORTON

Agent

126 Craig St. West

Montreal, Que.



LeBLOND Heavy Duty Milling Machines

Plain or Universal Types—Cone or Gear Drive. All commercial sizes No. 0 to No. 5.

Adapted for the Heaviest Manufacturing or the most exacting tool room service. A suitable Range and Capacity for every class of milling.

Patent Self-Aligning Arbor Supports—

Hardened Steel Spindle Bearings—Double-Friction Back Gears—and the simplest type of right-hand control, contribute to an increased production and longer life as a precision machine.

**The R. K. LeBlond Machine
Tool Company**

CINCINNATI, OHIO, U.S.A.

Canadian Agents:

THE A. R. WILLIAMS MACHINERY CO., LIMITED
St. John, N.B. Montreal, P.Q. Toronto, Ont.
Winnipeg, Man. Vancouver, B.C.



ELECTRIC Steel Castings

High Grade STEEL Castings
Of Every Description

Prompt Deliveries

Send us your drawings
for estimates.

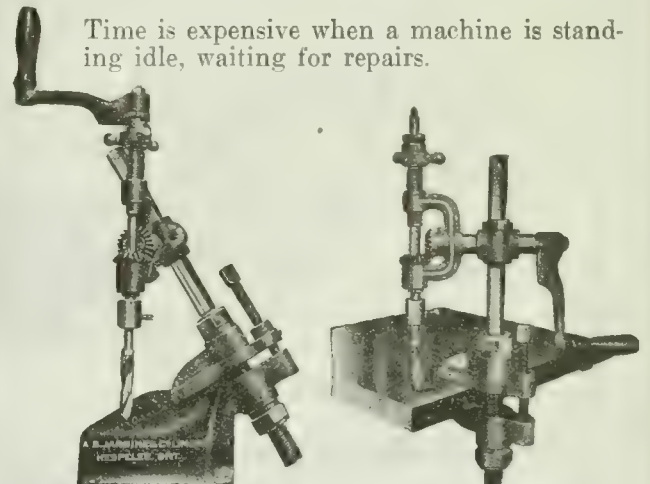
**THE ELECTRIC STEEL AND METALS
COMPANY, LIMITED**

WELLAND

ONTARIO

Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.

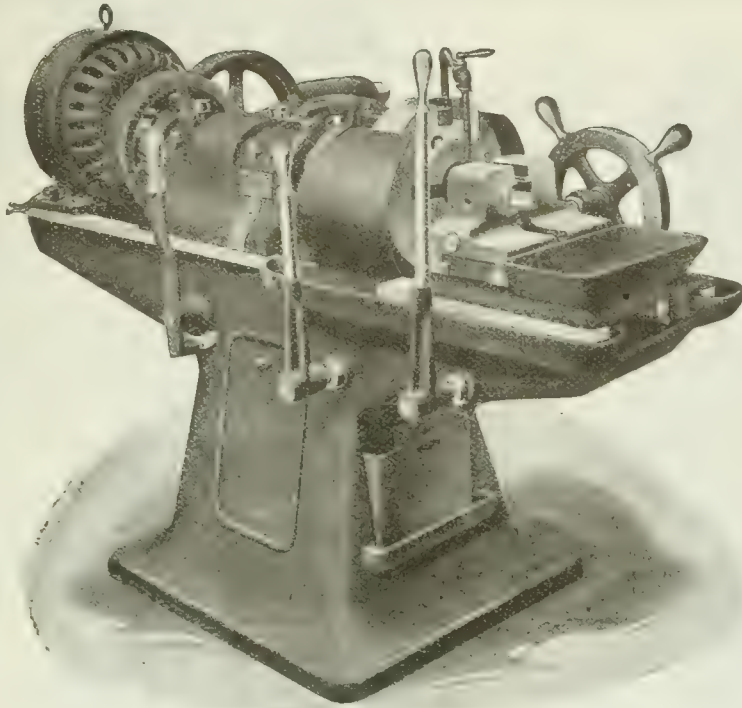


On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, \$26.50 net

Sold by all Machinery and Supply
Houses

A. B. JARDINE & CO., Limited
HESPELER, ONTARIO



FRONT VIEW
2-In. Single Head Nipple Machine—Motor Drive

**Our New 2" Single Head
Rapid Nipple and Pipe
Threading Machine—
Motor Drive**

Constant Speed Motor

All Gear Drive—Change

Lever

6 Changes of Speed

Large Reservoir

Special Oil Trough

Cutting Box

Many Other

Features

JOHN H. HALL & SONS, Limited

Manufacturers of
Pipe Threading Machinery

*We
Manufacture
All Sizes*

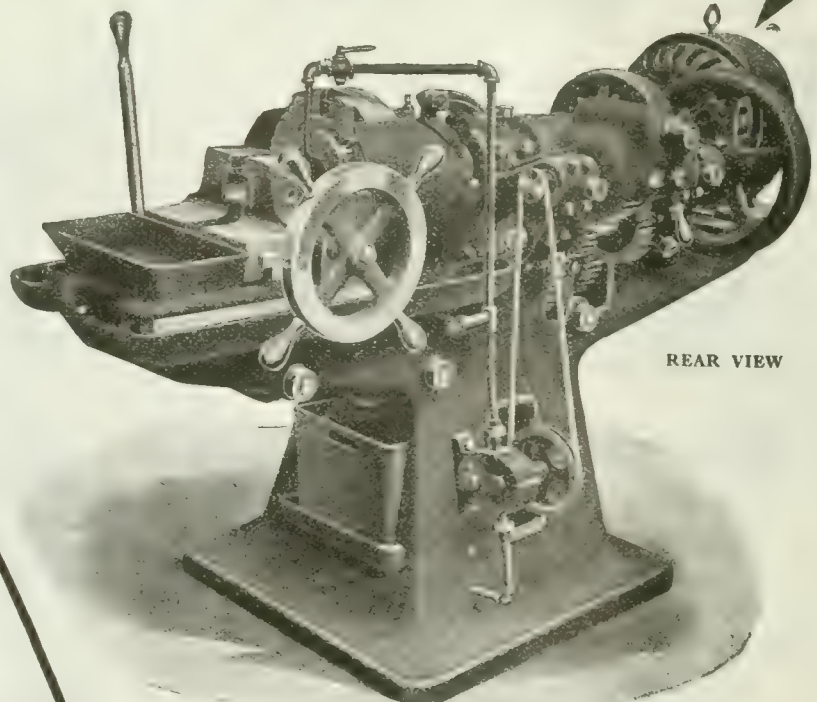
**Roller
Cutters**

Pipe Machines

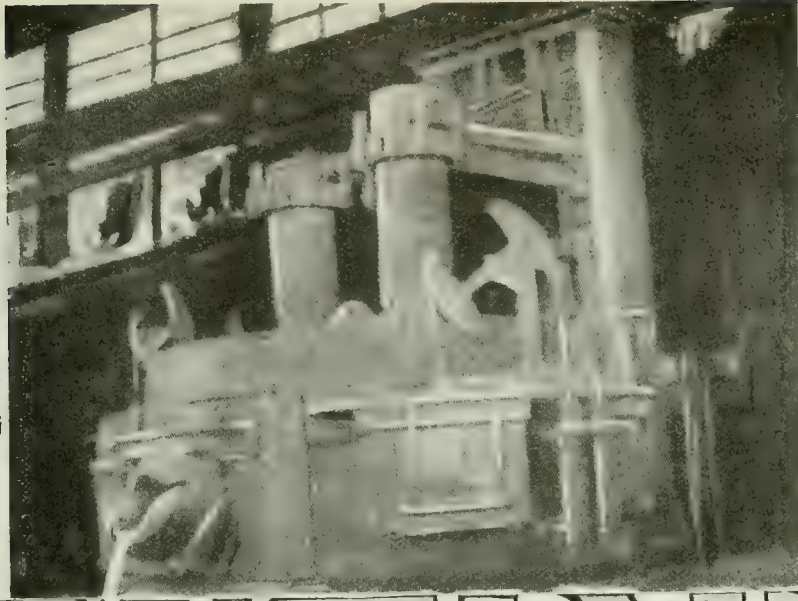
Nipple Machines

Special Machinery

WRITE FOR NEW
DESCRIPTIVE BULLETINS
JUST ISSUED



REAR VIEW



ELECTRICITY

**High
Speed
Steel**

SEVERAL factors combine to make this high-speed steel a triumph of the steel-maker's art; Electric Furnaces--entirely infallible, automatically regulated, delivering the same result time after time.

Uranium--This rare element, cousin to Radium, effects a profound change in the texture and quality of the steel.

Added to these, the constant care and skill of years of steel-making experience make the result of each melt a foregone conclusion.

Latrobe Electric Steel Co.
LATROBE, PENN.

URANIUM

WAR is destructive. Peace is constructive. War has taught us many things, chief of which is the great value of Time. Time is the essence of your life and mine. Whatever saves Time, saves Life.

"Red Cut Superior"

The Nationally Known **FIRST QUALITY
HIGH SPEED STEEL**

Is the Avowed Enemy of Waste and Inefficiency, and is Allied with Life

Save Time, Save Life. Are your
Tools made of **Red Cut?**

**VANADIUM-ALLOYS
STEEL CO.**

General Sales Offices, **PITTSBURGH, PA.**
Works, **LATROBE, PA.**



WOLFRAM

HIGH SPEED STEEL

VULCAN TOOL STEELS

for Every Purpose

Vulcan Special Vanadium—For Punches and Dies. Has wonderful wearing qualities.

Vulcan Non-Shrinkable—For Intricate Dies. Does not warp. Does not shrink.

Vulcan Regal No. 2—For Fine Finishing Tools. The highest grade tungsten finishing steel.

Vulcan Hecla—For work requiring great strength. The first high grade Chrome Vanadium steel produced in America.

WRITE FOR CATALOGUE

Vulcan Crucible Steel Co.

ALIQUIPPA

Established 1900

PA., U. S. A.

Makers of Wolfram High Speed Steel

BRANCHES:

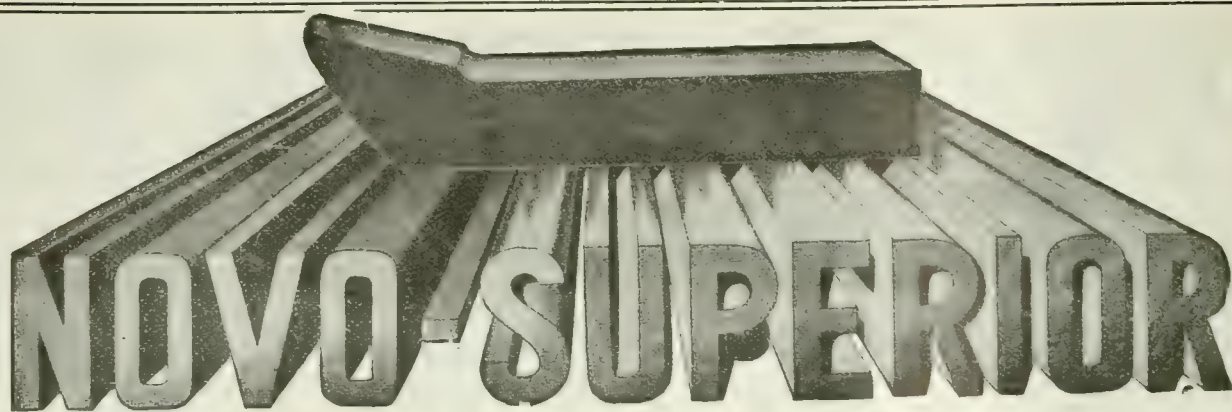
Boston
Chicago
Detroit

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INTRA STEEL

GIBRALTAR STEEL

Tool Steel for Every Purpose

Twist Drills, Taps, Hack Saw Blades, Milling Cutters, Files, Etc.,
Music Wire for Springs, Steel Balls.
Cold Rolled Mild Steel for Shafting, Etc.

We call to your particular attention that we make a specialty of
and solicit your inquiries for

Circular Saws—for wood and for hot or cold metal cutting

Machine Knives—for cutting wood, paper, tobacco, agricultural.

H. BOKER & CO., INC., 332 St. James St., Montreal, P.Q.

IMPERIAL GENUINE BABBITT METAL *The Highest Grade Manufactured*



Made specially for all HIGH SPEED, HEAVY ENGINES and EXTRAORDINARY HARD WORK

Manufactured and guaranteed to give excellent service by

THE CANADA METAL COMPANY, Limited, FRASER AVENUE TORONTO, Hamilton, Montreal, Winnipeg, Vancouver

HOYT METALS

**"Frost King"
"Trojan"
"Nickle Genuine"
BABBITTS**

Hoyt Metals have been used with great success for many years.

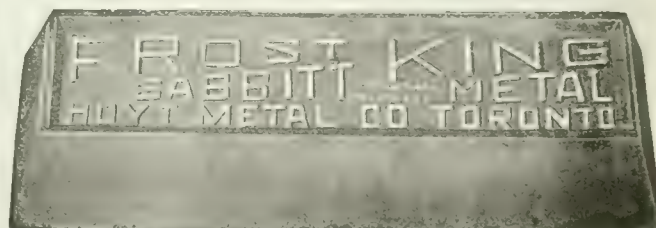
Put them to the test and you'll soon see a difference in your babbitt cost.

All elements entering into our mixtures are carefully refined and put together in such proportions and in such relation to each other that the best possible alloy is secured for the work for which it is designed.

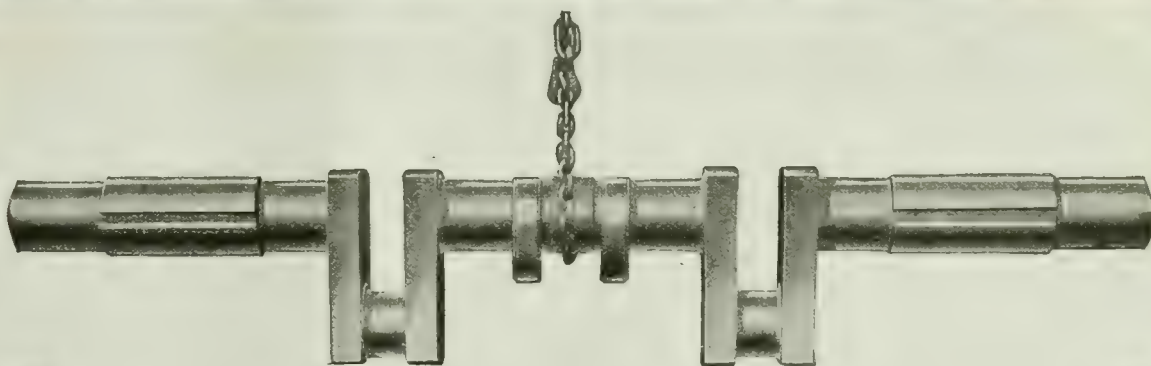
Annual sales over \$5,000,000.

Hoyt Metal, Co. Toronto

New York, N.Y. London, Eng. St. Louis, Mo.



CANADA FOUNDRIES & FORGINGS LIMITED



Why Worry? Bring It To Us If It Is a Forging.

Canadian Billing & Spencer Plant
Welland

HAMMOND DIE BLOCKS

The STANDARD FOR QUALITY

ALL SIZES FOR IMMEDIATE DELIVERY

HAMMOND STEEL CO., SYRACUSE, N.Y.

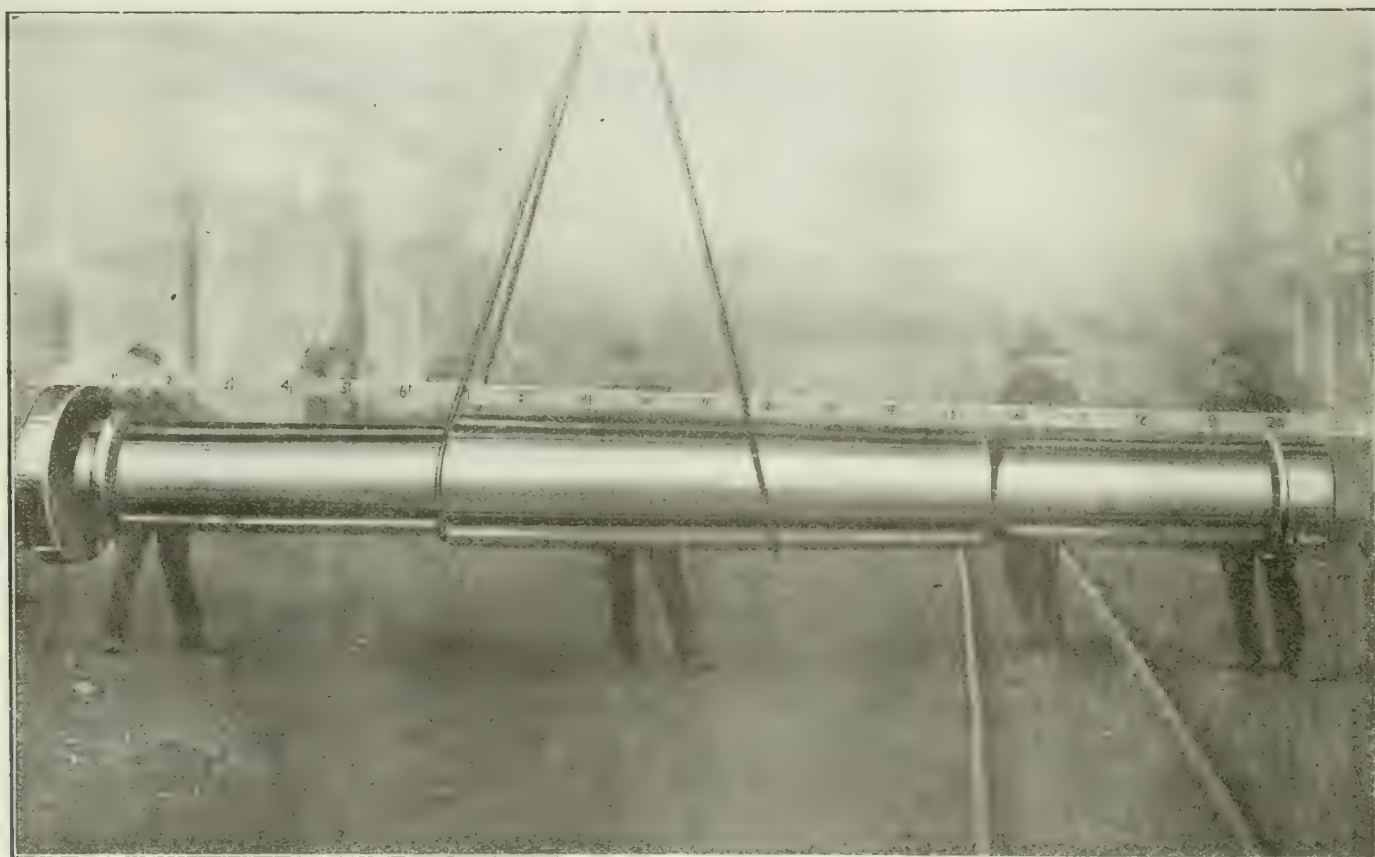
Detroit Office :---1257 DAVID WHITNEY BLDG.

Buffalo Office :---792 ELLICOTT SQUARE

New York Office :---312 HUDSON TERMINAL

Nova Scotia Steel & Coal Company *Limited*

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FINISHED COUPLING SHAFT, 18 IN. DIAMETER BY 21 FT. LONG

Heavy Marine Engine Forgings in the Rough or Finish Machined

Our Steel Plant at Sydney Mines, N.S., together with our Steam Hydraulic Forge Shop and modernly equipped Machine Shop at New Glasgow, N.S., place us in position to supply promptly Marine Engine Crank and Propeller Shafting, Piston and Connecting Rods; also Marine and Stationary Steam Turbine Shafting of all diameters and lengths, either as forgings or complete ready for installation, and equal to the best on the American Continent.

SaBeN ExTrA HIGH SPEED STEEL

The Highest Achievement
of British Tool Steel
Metallurgy

HADRURY COMPANY
LIMITED

MONTREAL

TORONTO

NEW YORK



Crucible

AND

Open Hearth Steel

Tool Steel

"ARGO" BRAND HIGH-SPEED STEEL

The John Illingworth Steel Co.

1856

Frankford,
New York Office

Phila.
217 Broadway

RALPH B. NORTON, AGENT
Montreal, Canada

Philadelphia GEAR Works

VINE STREET PHILADELPHIA, PA.

Spur, Bevel, Spiral, Herringbone and Intermittent

GEARS and PINIONS

Made in all kinds of metals, rawhide and fibre

SOCKET WHEELS
MADE TO ORDER

DISTRIBUTORS OF
DIAMOND CHAINS

For Power Transmission, Machinery
and Motor Trucks, Motor-Cycles and
Bicycles.

We ship gears to all parts of Canada.
Write us when you want good gears,
good service, good prices.

Get our Catalogue: "All About Gears."



BEVEL
BEVELS

Chapman

Double Ball Bearings

CONSERVE POWER! There is too much power going to waste the world over. This fact has been noted by the British Government and sweeping reforms are contemplated in Great Britain.

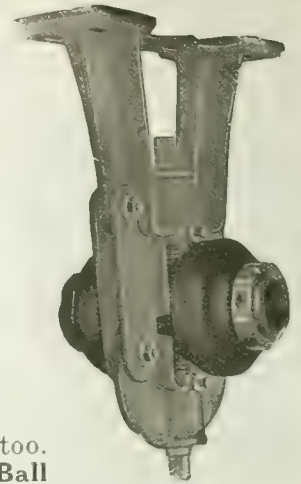
Canada also wastes much power. A reform is necessary here, too. Babbitt bearings are being used too often where **Chapman Double Ball Bearings** should prevail. The adoption of Chapman Double Ball Bearings, wherever an axle or shafting needs support in the transmission of power, results in a saving of 75% of friction loss.

Now in use in over 2,000 Canadian factories. Fit any adjustable hanger. Adopted by Canadian and United States Governments.

Write for full story of their efficiency.

Chapman Double Ball Bearing Company of Canada, Ltd.

Room 408 Shaughnessy Bldg., Montreal. 339-351 Sorauren Ave., TORONTO, Canada.
Transmission Ball Bearing Co., Inc., 1050 Military Road, Buffalo, N.Y.



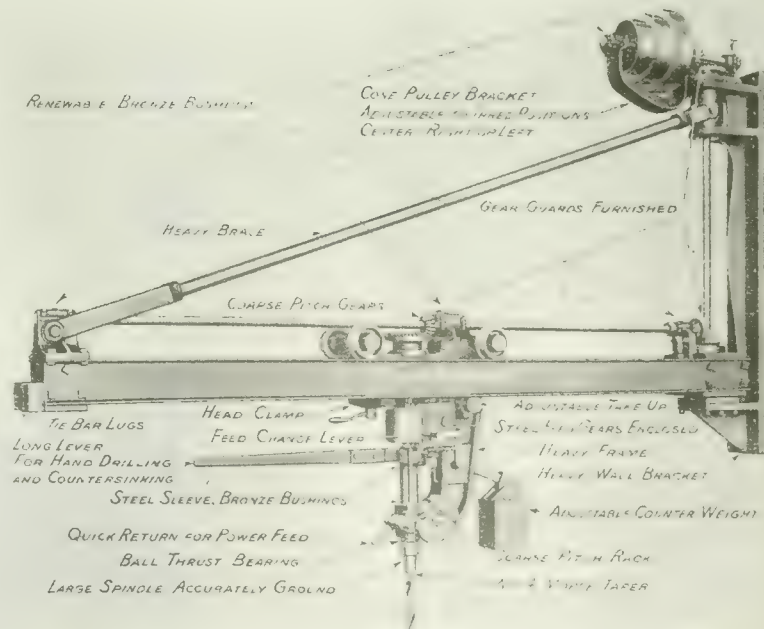
A "Strikingly Different" WALL RADIAL DRILL

This is a real machine tool. Careful design and high-grade materials contribute to its great success and economy. Much wider range is possible on this drill than the ordinary radial. The head is exceptionally rigid, yet moves with extreme ease from end to end of arm. For the crowded shop this drill is ideal, as when not in use it can be pushed back out of the way.

MADE IN FOUR STANDARD SIZES

Rated size	Drills to center of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

F.O.B. Boston, Mass.



LYND-FARQUHAR COMPANY

419-425 Atlantic Avenue

BOSTON, MASS.



"Not Steel but its Master"

PROPER PROCEDURE + STELLITE = PRODUCTION AND ECONOMY

One of Toronto's new industries was presented by us with a Tool-Holder Bit of No. 3 STELLITE to try out on Cast Iron.

They made tests with the best brands of High Speed Steel as against STELLITE, and found that they were able to run at double the speed and feed by using STELLITE.

"AS A MATTER OF FACT A TOOL BIT OF $\frac{3}{8}$ -inch square STELLITE HAS TURNED OFF 35,000 TIMES ITS OWN WEIGHT OF CAST IRON IN TEN DAYS."

As a consequence of their own tests they laid out their transmission to accommodate STELLITE and are now getting a much larger production than they had estimated.

We visited them recently and warned the Superintendent to save his shop-ends of STELLITE, as they were worth \$2.00 per pound to his firm.

This was like getting money from home, as he had already decided to use STELLITE without this added incentive.

ASK FOR DEMONSTRATION.

Deloro Smelting & Refining Company, Limited

TORONTO

200 King Street West

H.O. and WORKS: DELORO, ONT.

MONTREAL

315 Craig Street West



Silent Chain Drives Help Prevent Tools From "Chattering"

ON horizontal boring mills, where the columns must often be located far apart, the tools are likely to "chatter" if the power application is not uniform and steady.

Link-Belt Silent Chain Drives transmit the power from motor to machine in a steady, uniform, positive "stream". There is no slippage. And yet, the chain cushions the machine against shock when heavy loads are suddenly applied.

Link-Belt Silent Chain Drives lengthen the life of the driven machine, improve the product, save power, save floor space, and increase production.

They are "flexible as a belt, positive as a gear, more efficient than either." Our Machine Tool Drive Book No. 312 gives details. Send for a copy.

CANADIAN LINK-BELT CO., LTD.

WELLINGTON and PETER STS., TORONTO

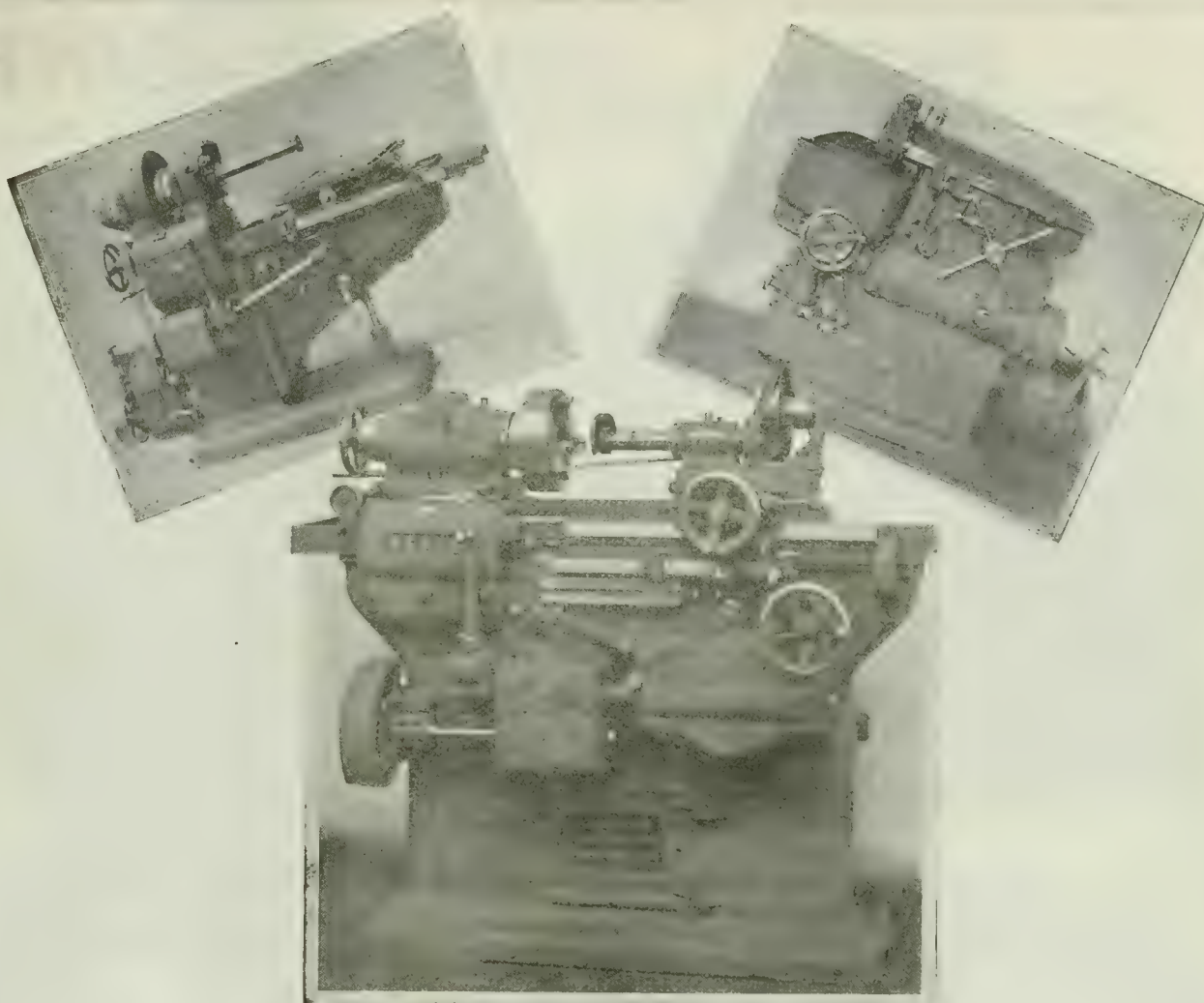
LINK-BELT

SILENT CHAIN DRIVES

We Also Make

- ☐ Elevators and Conveyors
- ☐ Link-Belt and Sprockets
- ☐ Silent Chain Drives
- ☐ Truck and Tractor Chains
- ☐ Electric Hoists
- ☐ Locomotive Cranes
- ☐ Wagon Loaders
- ☐ Coal and Ashes Systems

Write for Catalogs
Place X in Square



INTERNAL AND SURFACE GRINDING

If you do surface or internal grinding one of these three will handle your work to best advantage.

The CYLINDER GRINDER will take care of all work that cannot be rotated to advantage, such as two, four or six cylinders en bloc, and awkward large size castings of any material.

The INTERNAL GRINDER produces absolutely accurate holes, either straight or taper, in hardened steel, iron or bronze. It is ideal on bushings, gears, collars, ball bearing races and a thousand other parts, where accuracy and production are essential.

The SURFACE GRINDER delivers at a commercial rate a mirror finish on keys, rings, cutters, dies, discs, collars; in fact any shaped part whose size is within the capacity of the chuck.

Send for a Complete Folder Catalog

The Heald Machine Company
WORCESTER, MASS., U.S.A.

Standard the
World Over

THE "RACINE"

The Machine for High Speed Metal Cutting

To successfully meet competition in the future you must adopt modern machines; machines that mean quality as well as quantity production. The RACINE is the tool you need. It increases speed, minimizes waste, reduces cost and is absolutely accurate.

Equipped with patented automatic lifting device which raises the blade of the non-cutting stroke and eliminates all dragging and strain on the blades. This means a saving in material, increased speed, long life for blades and greater production. Let us explain the machine fully. Write.

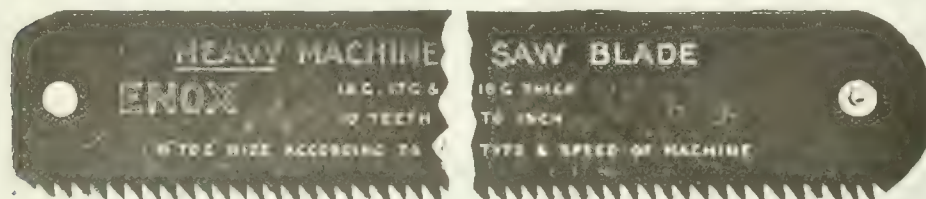
RACINE TOOL & MACHINE CO.

Melbourne Avenue
RACINE, WIS., U.S.A.

Use "Racine" HS Tungsten
Power Blades



SIMONDS
HACK SAW BLADES
UNEQUALED IN QUALITY ANY SIZE OR LENGTH
Simonds Canada Saw Co. Limited
ST. JOHN MONTREAL VANCOUVER



HEAVY MACHINE
ENOX
1 1/2 IN. WIDE
12 TEETH
1 1/2 IN. WIDE ACCORDING TO

SAW BLADE
ENOX
1 1/2 IN. WIDE
12 TEETH
1 1/2 IN. WIDE ACCORDING TO

ENOX Hacksaw Blades

ARE THE BEST



LIGHT MACHINE BLADE
ENOX
1 1/2 IN. WIDE
12 TEETH

HAND
ENOX
1 1/2 IN. WIDE
12 TEETH

SAW BLADE
ENOX
1 1/2 IN. WIDE
12 TEETH

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Liberal Terms offered to firms willing to carry stocks and act as sole agents for the district.

Sole Makers:

FRY'S (LONDON) LIMITED

AN ENTIRELY BRITISH COMPANY

46 Upper Thames St., London, E.C. 4, England.

Works: Greenwich, S.E. 10

Agents for Canada, East of Fort William:

THE STANDARD MACHINERY & SUPPLIES, LIMITED, 261 Notre Dame St. West, MONTREAL, QUE.

Agents for British Columbia—The A. R. Williams Machinery Co., Limited, 495 Railway St., Vancouver, B.C.

Starrett Tools



Accuracy—an element of speed and economy

With accurate and dependable tools mechanics can feel confident that work accomplished will be **right**. So greater speed and higher quality work are attained; time is also saved, which ultimately means economy.

Write for Catalog No. 213. It shows many styles and sizes of these accurate tools that save time and money in the long run.



The L. S. Starrett Company
ATHOL, MASS.

The World's Greatest Toolmakers. Manufacturers of Hack Saws Unexcelled.

New York

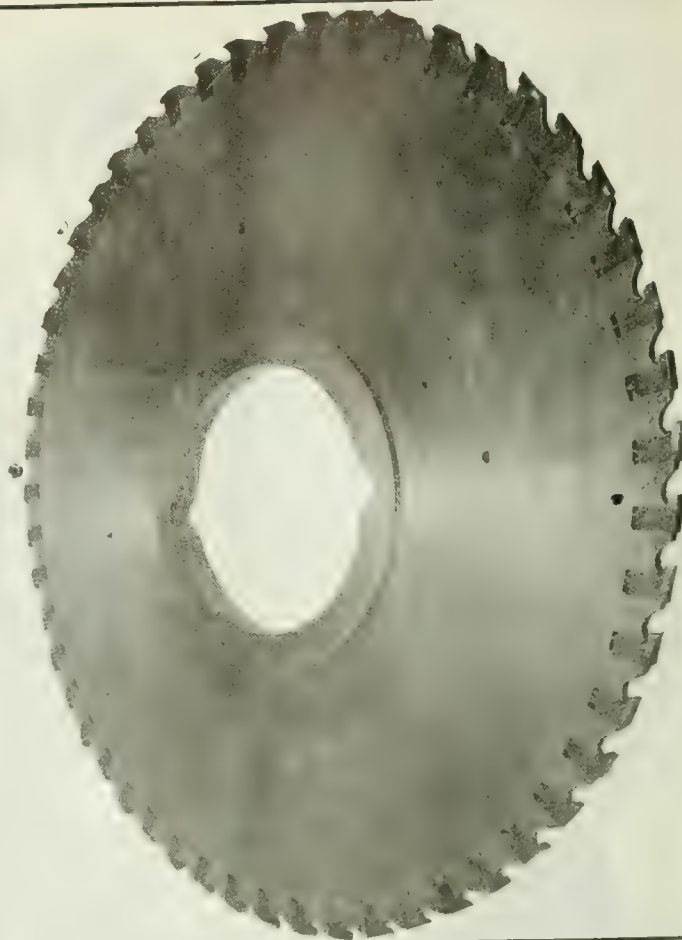
London

Chicago

42-5009

90-inches in diameter

Cut on right shows a Hunter Duplex Inserted Tooth Saw used by the Erie Forge Co. for cutting gun forgings. It is the largest inserted tooth saw blade we know of ever having been made in the United States or any other country—1" plate, 1 5/16" kerf, and contains 56 high-speed steel teeth, and weighs approximately 3,000 lbs.



Hunter Duplex Saws

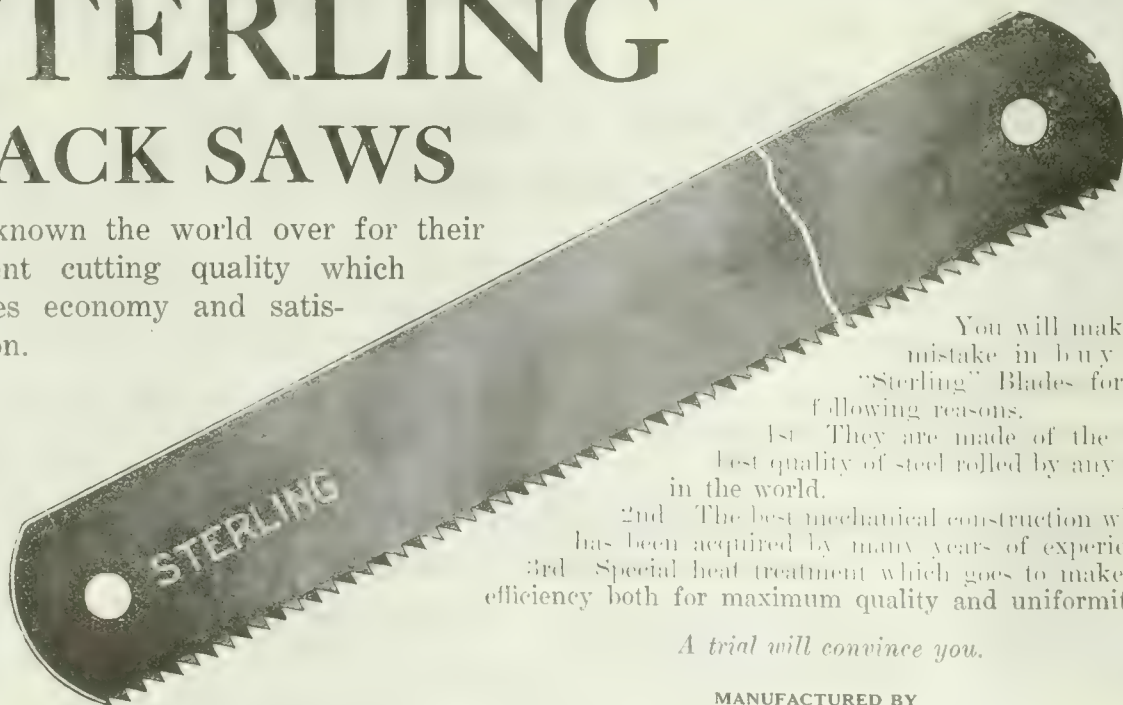
No matter what your sawing requirements may be, there is a Hunter "Duplex" Saw that is just right for the work. The discs are made of Chrome-Vanadium Steel, oil treated.

Hot Saws, Friction Discs, Solid Blades made of Vanadium, Tungsten and Chrome Alloy Steels. Saw Sharpening Machines. Inserted Tooth Grinders. Hardened Steel Specialties. Write for prices.

Hunter Saw & Machine Co.
Pittsburgh, Pa., U.S.A.

STERLING HACK SAWS

Are known the world over for their efficient cutting quality which insures economy and satisfaction.



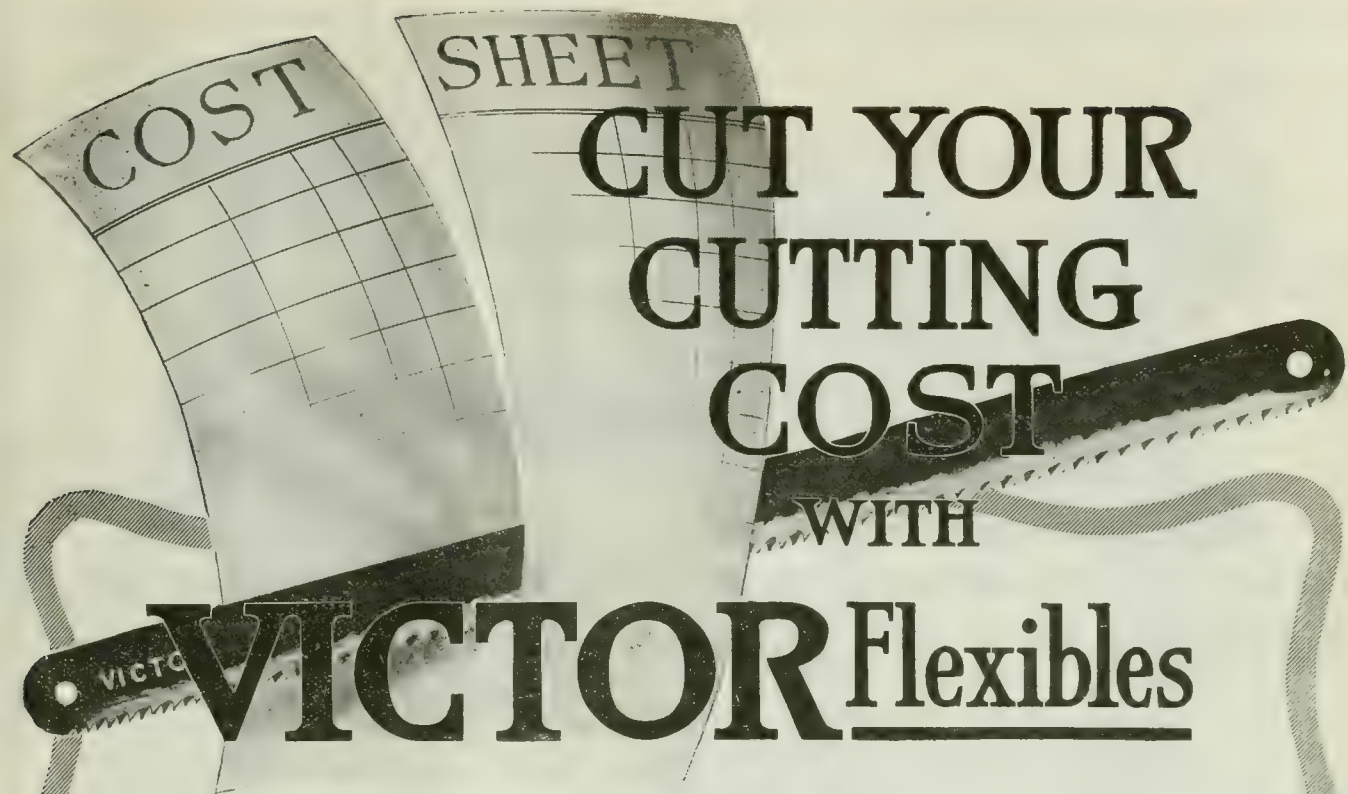
You will make no mistake in buying "Sterling" Blades for the following reasons.

- 1st They are made of the very best quality of steel rolled by any mill in the world.
- 2nd The best mechanical construction which has been acquired by many years of experience.
- 3rd Special heat treatment which goes to make the efficiency both for maximum quality and uniformity.

A trial will convince you.

MANUFACTURED BY

Diamond Saw & Stamping Works
BUFFALO, N.Y., U.S.A.



The high cost of tools should emphasize more than ever the importance of quality.

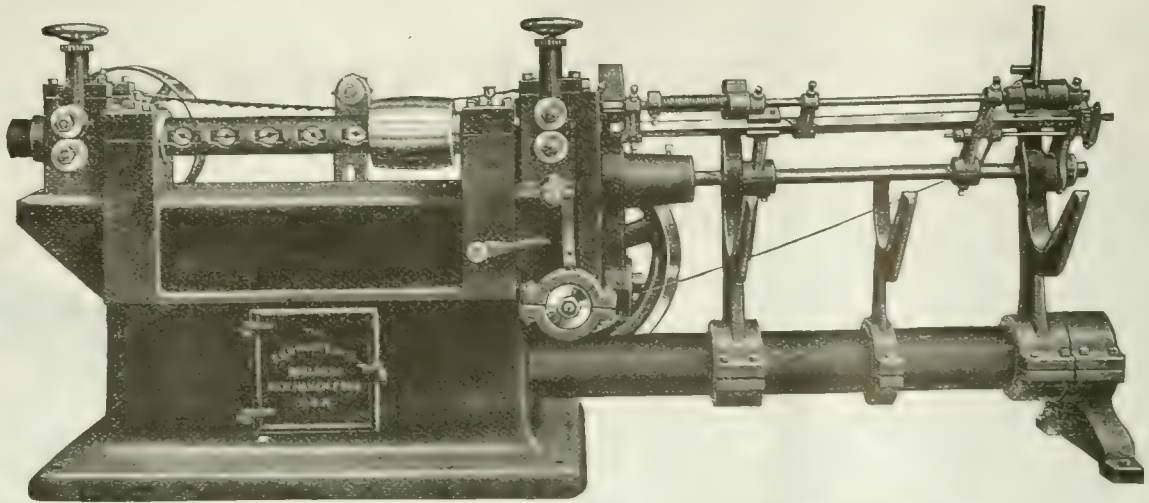
The high cost of hack saw blades ought to drive every hand blade user over to the saw that does not break in ordinary hand work.

VICTOR FLEXIBLE HACK SAW BLADES have exactly the same cutting power as the finest All-Hard on the market, and that they cannot be broken in use except by intentional abuse is an undisputable fact—which will represent a saving from twenty-five percent to thirty-three and one-third percent in breakage alone.

Seventy-five percent of the All-Hard blades used in hand frames break before they are worn out. Watch the All-Hard blades in your own shop and see the enormous amount of breakage—then use VICTOR FLEXIBLES and note the economy.

VICTOR SAW WORKS LTD - HAMILTON, CANADA





Perfect Wire Straightening Quickly and Profitably Done on Our Automatic Wire Straightening and Cutting Machine

Just put your coil of wire on the reel, adjust the rolls and dies, and set the gauge for the length you want. The machine does the rest—thousands of feet per day, perfectly straight and cut to accurate lengths.

Catalogue tells more about them, and we'll be glad to send you a copy.

THE F. B. SHUSTER CO., New Haven, Conn.

FORMERLY JOHN ADT & SON

ESTABLISHED 1866

ALSO MAKERS OF STRAIGHTENERS FOR SQUARES, HEXAGONS, FLATS, ETC.

The *Greenfield* Universal Grinder

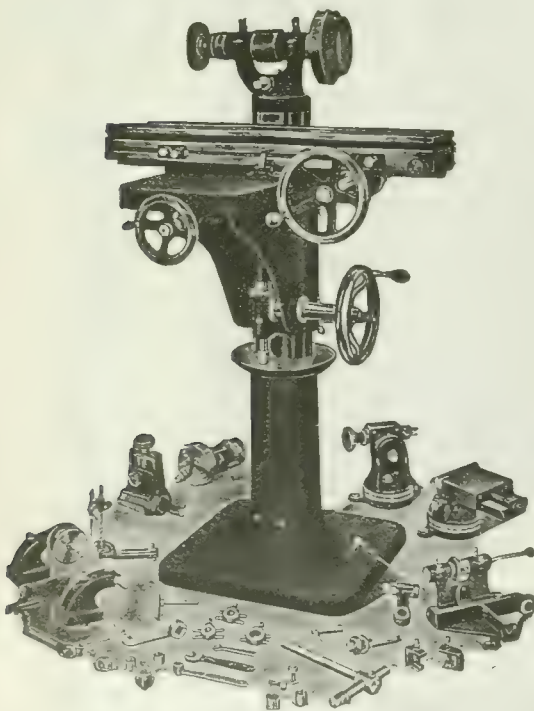
For General Tool Room Work

This Grinder is furnished with attachments for grinding all sorts of milling cutters, reamers, counterbores, and other machine shop tools.

It is also suitable for cylindrical, internal and flat work which frequently turns up in the making of tools and jigs.

These attachments are all very simple in design and easily adjusted upon the machine, being graduated so that any desired angles can be at once obtained.

The whole machine is thoroughly well built, well finished, and will be found a dependable, convenient grinder.



Greenfield Machine Company,
GREENFIELD, MASS., U.S.A.

RICKERT-SHAFER TAPPERS

The *smooth drive* reduces the strain on the taps—they wear longer—and there are fewer delays from taps breaking in the work.

R-S Tappers ensure faster tapping and quicker assembling.

Friction drive, absorbing all the shock, allows a chuck speed of 140 r.p.m. on $\frac{5}{8}$ -in. work—50 per cent. faster than the usual tapping speed for that size. Uses but 1 h.p.

Write for specifications

The Rickert-Shafer Co.

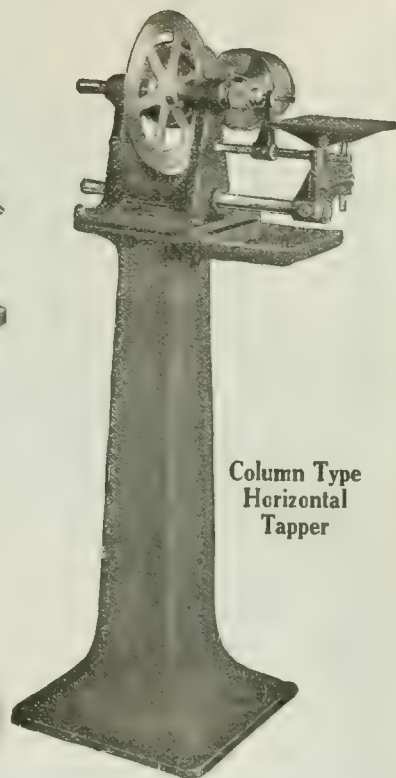
ERIE, PA., U.S.A.

FRED HERBERT, Foreign Agent, Coventry, England

Save Tap Breakage



$\frac{1}{4}$ -in.
Vertical
Tapper



Column Type
Horizontal
Tapper



Silver's Drills



Fast, Strong, Accurate and Dependable Drills with an experience of 65 years behind them—they can be depended on to finish the work and do it right.

The 20" is made in four distinct styles with round or square base, and can be furnished singly or in gangs of 2, 3, or 4 spindles.

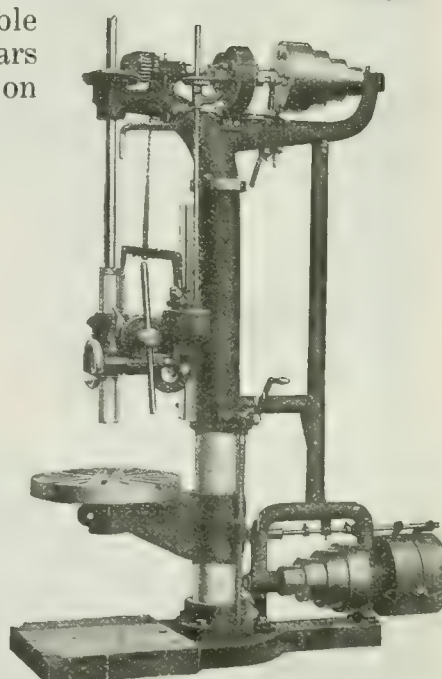
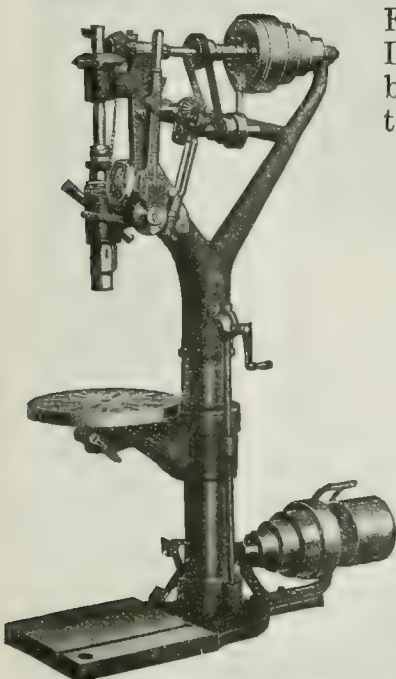
The 25" has eight spindle speeds and six positive geared feeds.

Send for full description and quotations.

The Silver Mfg. Co.

290 Broadway

SALEM - - OHIO



"CANADIAN"

ACCURATE work demands accurate and efficient tools.

The Canadian No. 5 has some features worth considering.

Eight speeds, three power feeds—also hand and lever feeds.

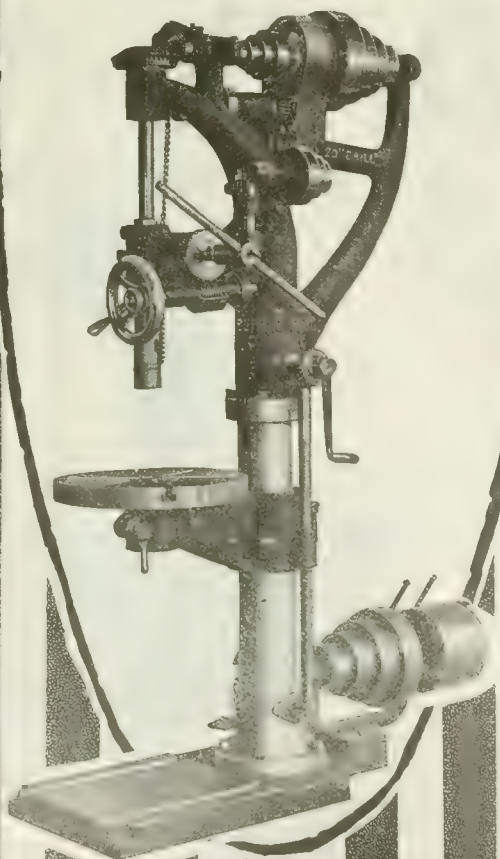
The twist of a knurled knob changes instantly plain drive to back geared drive—no tools to get lost or bother with.

An adjustable automatic trip throws out power feed when piece has been drilled to required depth.

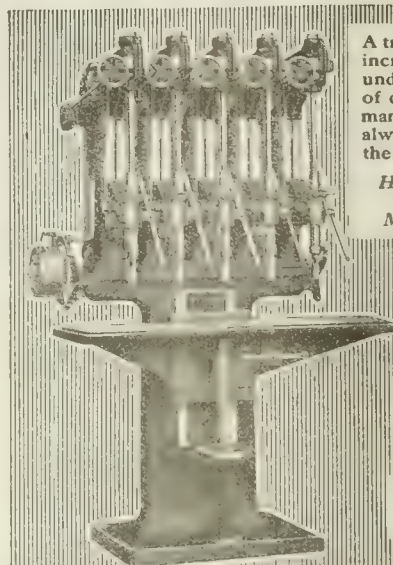
Split adjustable bearings, ball bearing graduated spindle—but then there are so many features—for complete description write for literature.

Circular 1199-16 describes the whole Canadian Upright Series

Canadian Blower & Forge Co., Limited
Kitchener, Ontario



HENRY & WRIGHT Drilling Machines



A tremendous increase in the understanding of drilling for manufacturing always follows the use of all

Henry and Wright Machines

Class K
Number 5

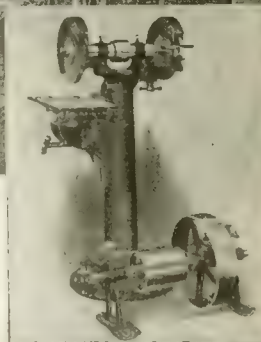
The Henry & Wright Mfg. Co.
Hartford, Conn.

Canadian Fairbanks-Morse Co., Montreal, Toronto, Winnipeg;
A. R. Williams Machinery Co., Toronto, St. John, N.B.;
H. W. Petrie, Ltd., Toronto; Williams & Wilson, Montreal;
Rudel-Belnap Machinery Co., Montreal; Canada Machinery Corp.,
Galt, Ont.; Geo. F. Foss Machinery & Supply Co., Montreal;
General Supply Co., Montreal.



**WE BUILD
THEM BY
HUNDREDS**

Standardized Production enables us to offer this powerful Waterbury Grinder at such a low price. It grinds rapidly and accurately, all flat surfaces, dies, punches, planer, lathe, and other tools. Has adjustable table and tool rest with large radius of travel. Rigid, 3-point table supports giving great steadiness. A reliable, practical grinding outfit.



Blake & Johnson Co., Waterbury, Conn.



BROWN'S

Beaver Brand Metals

Copper, Brass, Bronze, Canada Silver, and Gilding Metal in sheets, rolls, plates and rods. Naval Bronze, Yellow Metal and Muntz Metal in sheets and rods for shipbuilding requirements. Specify Beaver Brass Rod for drilling and free cutting. Extruded shapes.



Seamless Brass and Copper Tubes.
Guaranteed Ingot Metals—Yellow, Red and Composition Ingots.
We are Purchasers of Copper Bearing Material.
Link up with Beaver Brand Products—you'll like the quality, price and service.

Brown's Copper & Brass Rolling Mills, Limited

New Toronto, Ont., Can.





MADE IN CANADA

**Malleable and Cast Iron
PIPE FITTINGS**

Both Screwed or Flanged,
Black or Galvanized—All Sizes



**MALLEABLE AND
GREY IRON
CASTINGS**

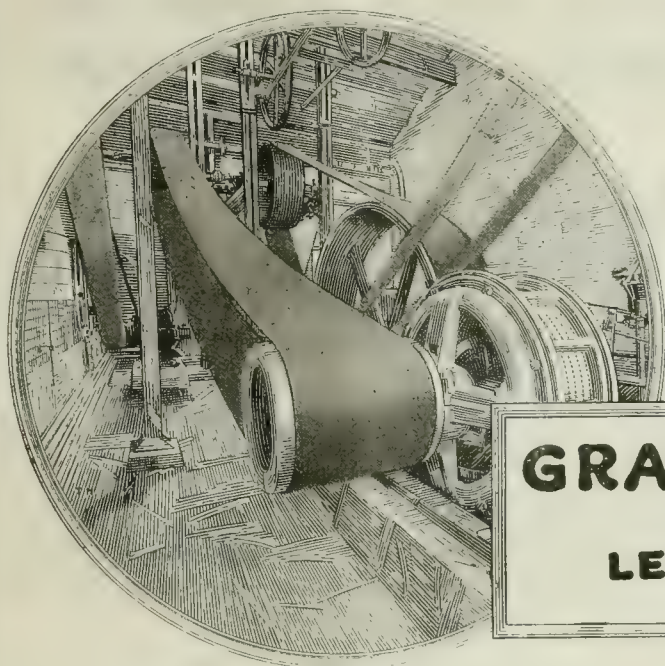
For General Machine Shop
Work, for Manufacturers
of Automobiles and Speci-
alty Manufacturers.

Quality
Products

We have the facilities for filling your orders
with exceptional promptness. Annual
capacity 6,000 tons.

Prompt
Service

International Malleable Iron Co., Limited
Guelph, Ontario



GRATON & KNIGHT

Standardized Series

LEATHER BELTING

Tanned by us for belting use

HERE is pictured a 75 foot Graton & Knight Heart Brand Belt in the plant of the Model Mill Company, Johnston City, Tenn. It is 24 inches wide, double-thick. It transmits 241 Horse Power. It has been in continuous hard service for five years. Its cost per week has been \$1.35, or five mills per horse power, per week.

Power and the Right Material

Leather is the right material for belting. It is firm. It is strong. It has permanent power of expansion and contraction. It is tough, but it yields in the right degree, at the right time. It is easily and repeatedly spliced or repaired. It stands mauling by shifters. Side-slapping won't fray it. Even after long use it can be cut into narrow belts and goes on with its good work.

Leather stands alone as to these characteristics. It is Nature's contribution to power transmission needs. No other known substance is like it in wearing qualities. And no other belting material successfully replaces it.

There is no mystery about the quality of the leather in Graton & Knight Standardized Series Belts. It's in the tan-

ning—an operation based on the work to be done. The yearly output of our tannery is nearly 300,000 hides. That makes you sure of uniform quality for any given specification. For there is a wide scope of selection from such a mountain of leather.

Graton & Knight Standardized Series Belts are made to give the longest possible service at the smallest possible cost. Those who use them say that they do.

Many of the best-belted plants ask us to specify the belting for every drive. Try the plan yourself. Then, when buying, call for "Graton & Knight Brand — or equal." This won't commit you to buying our belts. It will put your buying on the one basic consideration — the work to be done.



Write for new book about Standardized Leather Belting

THE GRATON & KNIGHT MFG. COMPANY, Worcester Mass., U.S.A.

Oak Leather Tanners. Makers of Leather Belting, Lace Leather, Packings, and Specialties

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Canadian Graton & Knight, Ltd., Montreal. Canadian Representatives: The Canadian Fairbanks-Morse Co., Ltd., St. John, Montreal, Ottawa, Toronto, Hamilton, Quebec, Calgary, Saskatoon, Vancouver, Windsor, Winnipeg, Victoria

"We tried Goodyear Extra Power on our hardest pull before ordering in large lots"

"Now we have decided to replace with Goodyear Extra Power all other types of belt as they wear out"

The experience of the Pease Foundry Co., of Brampton, is the experience of hundreds of other users of belting in Canada. Read what Mr. J. G. McKinnon, Manager of the Brampton plant, says in his recent letter to us:

"Your Extra Power Belting is giving us splendid satisfaction. We were averse to trying Extra Power, but now we are sorry we did not use it when we installed our latest equipment.

"We now have about \$1,500 worth in use in our plant.

"We tried Extra Power on our hardest pull before ordering in large lots.

"Now we have decided to replace with Extra Power all other types of belt as they wear out."

Such tests as this are the basis of the astonishing success of Goodyear Extra Power Belting. Where *unusual* service was needed—Goodyear Extra Power made good. The result has been a vast sale of Extra Power for ordinary drives—the "day-in-and-day-out" drives that factory men want to equip with good belts and forget.

Improved service and lower belting costs have come wherever Goodyear Extra Power Belting has been installed.

Often it has overcome conditions under which other belts failed completely.

In many plants it has speeded production amazingly.

Always it has cut belting costs *and* power cost.

The particular construction of Goodyear Extra Power makes it tremendously strong, yet flexible and pulley-hugging. A friction surface assures efficient delivery of power to the pulleys.

We train men to solve belting problems. The Goodyear Belting man has a big story to tell you. Perhaps he may help you. His service involves no obligation.

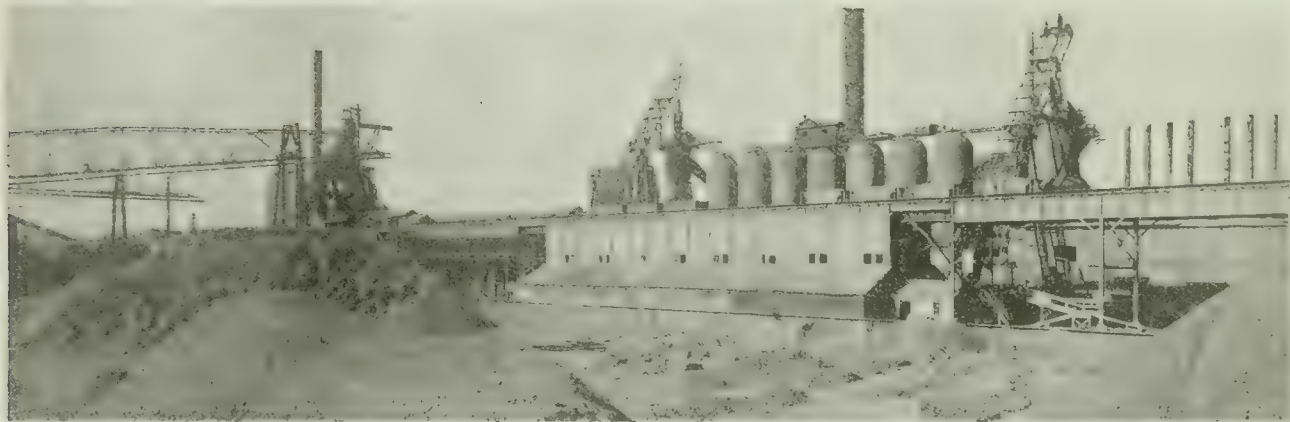
The Goodyear Tire & Rubber Co. of Canada Limited

Branches: Halifax, St. John, Montreal, Ottawa, Toronto, Hamilton, London, Winnipeg, Regina, Calgary, Edmonton, Vancouver. Service stocks in smaller cities.

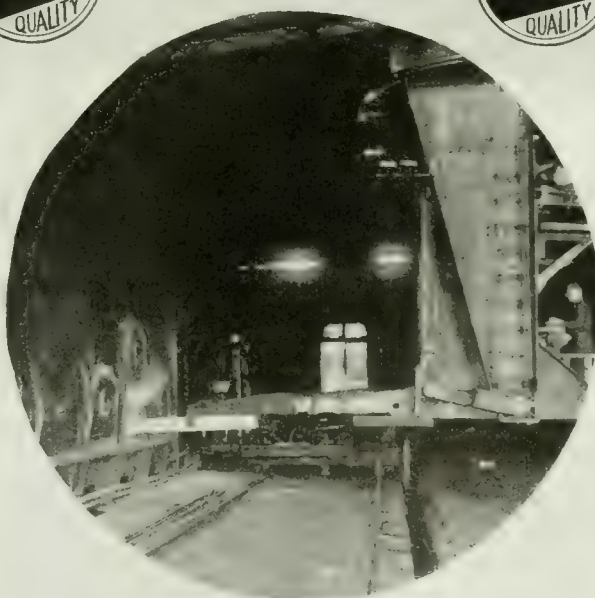
GOODYEAR
MADE IN CANADA
EXTRA POWER BELTING

ALGOMA STEEL CORPORATION, LTD.

SAULT STE. MARIE, ONTARIO



**BLOOMS,
BILLETS,
SLABS,
STRUCTURAL
STEEL
MERCHANT
BARS
CONCRETE
REINFORCING
BARS
IRON, BRASS
AND BRONZE
CASTINGS**



Charging and Withdrawing Crane

Sulphuric Acid. Nitre Cake

**STEEL
RAILS**

Open Hearth Quality
(All Sections from 12 lbs
to 100 lbs per yard)

**SPLICE
BARS**

**STEEL
TIE PLATES**

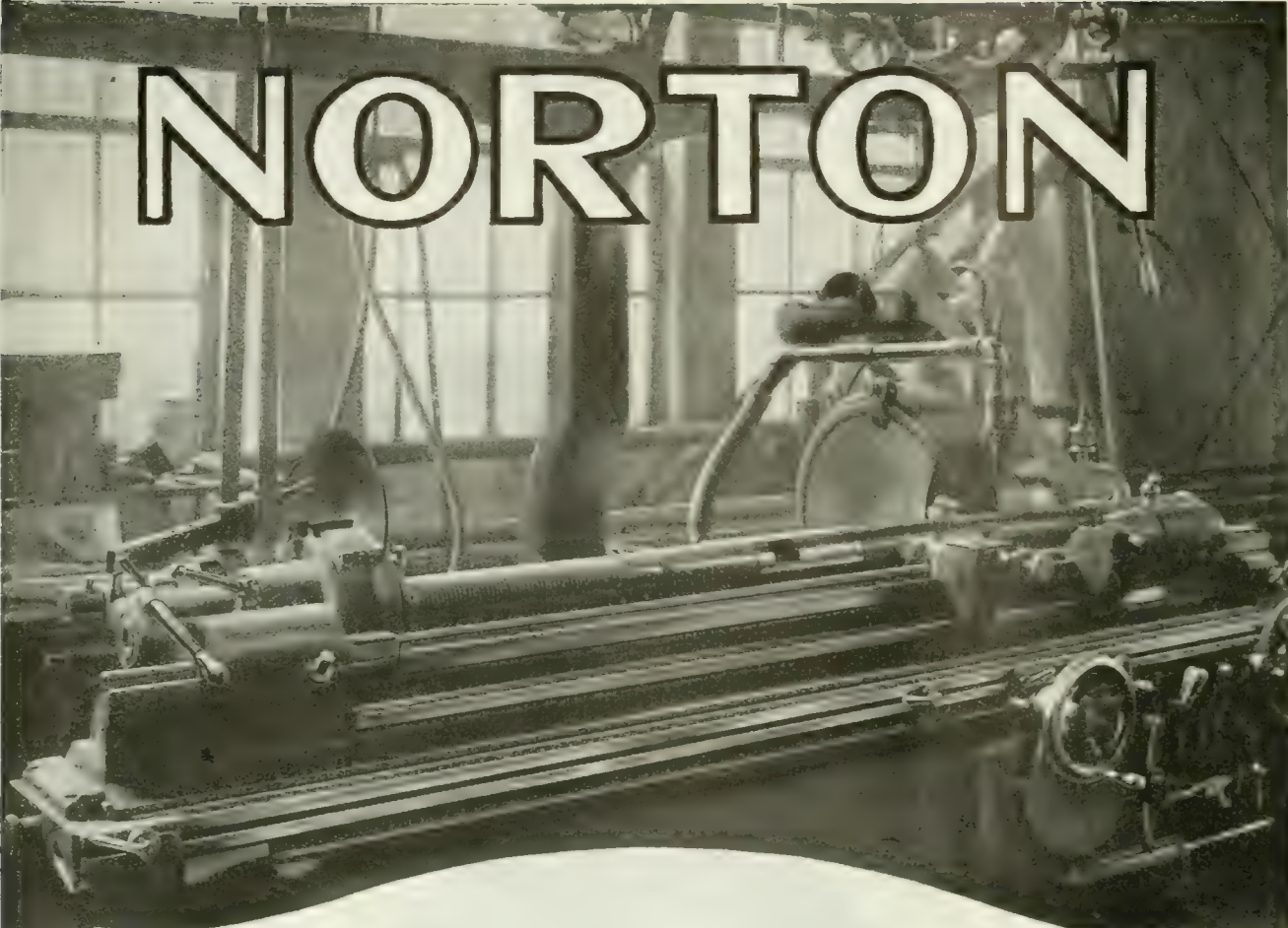
PIG IRON

BASIC, FOUNDRY-
BESSEMER

**SULPHATE OF
AMMONIA**



GENERAL VIEW OF THE PLANT OF THE ALGOMA STEEL CORPORATION FROM THE WATER FRONT



NORTON

In these days of gigantic demand Nortons everywhere keep production up

Here's a grinding job up in Vermont at the Jones & Lamson plant. It's a Drum Drive Shaft for a J & L Turret Machine. The material is machine steel and its rough size is $1 \frac{9}{32}$ in. x $1 \frac{17}{32}$ in. x $1 \frac{25}{32}$ in. x $1 \frac{13}{32}$ in. The finished size is $1 \frac{1}{4}$ in. x $1 \frac{1}{2}$ in. x $1 \frac{3}{4}$ in. x $1 \frac{3}{8}$ in.

A limit is set of .0005 in.—and maintained at the rate of 28 complete shafts per day.

Isn't an installation—in a plant so thoroughly well known in the quality field as Jones & Lamson—an endorsement for Nortons that you can't afford to overlook when you are ready for grinding machines?

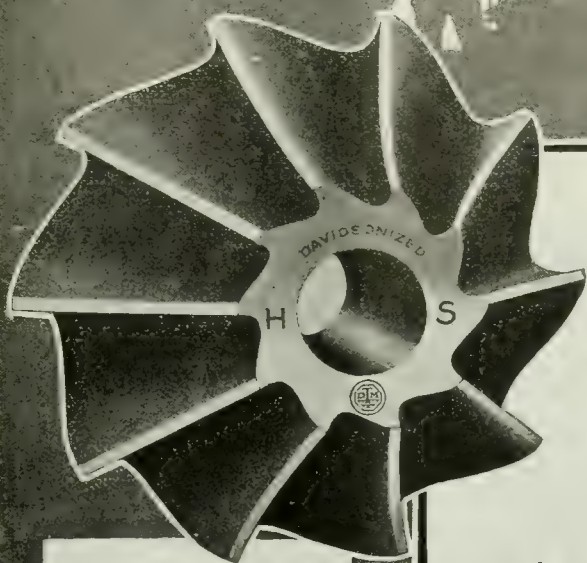
Norton Grinding Company, Worcester, Mass.

Chicago Store: 11 North Jefferson Street

Canadian Agents:

The Canadian Fairbanks-Morse Company, Limited

St. John	Quebec	Montreal	Ottawa	Toronto	Hamilton
Windsor	Winnipeg	Saskatoon	Calgary	Vancouver	Victoria



SPECIAL SERVICE

To Concerns Who Make
Their Own Tools

We supply Davidonized High-speed Steel Blanks in the semi-finished state, hardened and finished within grinding size (about .015 to .020 stock to be removed from working surfaces). This enables the user to obtain these tools of unequalled quality at a cost which compares most favorably with that of tools made from the solid bar.



Faster! Faster! Faster!

Lower production costs! Every day they are becoming more important. Facing a period of re-adjustment and rapid changes, with increasingly keen competition in home markets and the unprecedented opportunity to compete favorably abroad, right now is the time to reduce your production costs by speeding up!

Increase Production With

DAVIDONIZED HIGH-SPEED STEEL TOOLS

As evidence that these tools *will* enable you to increase your production radically, we quote from one of our great American gun plants:—

30% Increase in Cutting Speed

"Please be advised that we placed into production the Formed Milling Cutters received from you for milling the sectors on breech blocks made of 3½% nickel steel, and obtained an increase of 30% in cutting speed to secure the same number of pieces in production before it became necessary to re-grind, using same feed and depth of cut."

Think What This Would Mean in Your Plant

Any equipment that will increase production is worth considering, even if it involves added investment. But using Davidonized tools does *not* require that; you need tools anyway. And your increased output through the use of Davidonized tools will cut down the percentage cost of all the important items that make up your overhead—space, depreciation of costly machines, labor, etc. The cost of every milling operation in your plant will be reduced in two ways through the use of Davidonized High Speed Steel Cutters—first, by the *increased output per machine per hour*; second, if Davidonized cutters are run under only same conditions as others, by the *greater number of pieces per grinding obtainable*. The latter feature will lower tool costs to an extent which makes these tools far more economical than any others.

DAVIDONIZED HIGH-SPEED STEEL TOOLS are revolutionizing production standards. We guarantee them to out-perform any others you are using, whether of your own or outside make, and to outlast them. If they do not make good this guarantee, it is your privilege to return them and we will cancel all charges.

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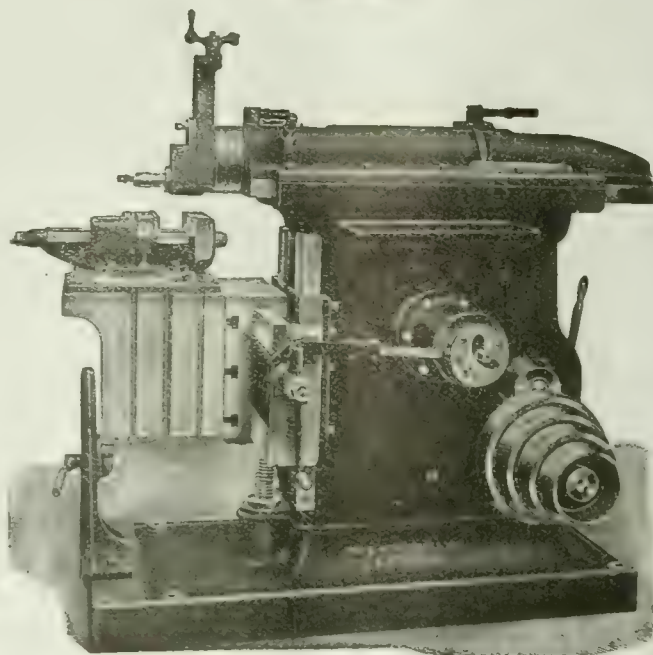
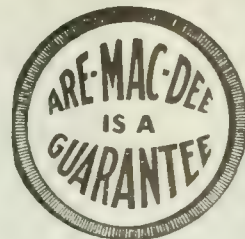
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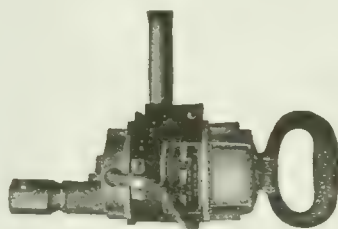
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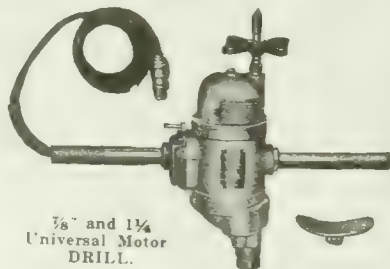
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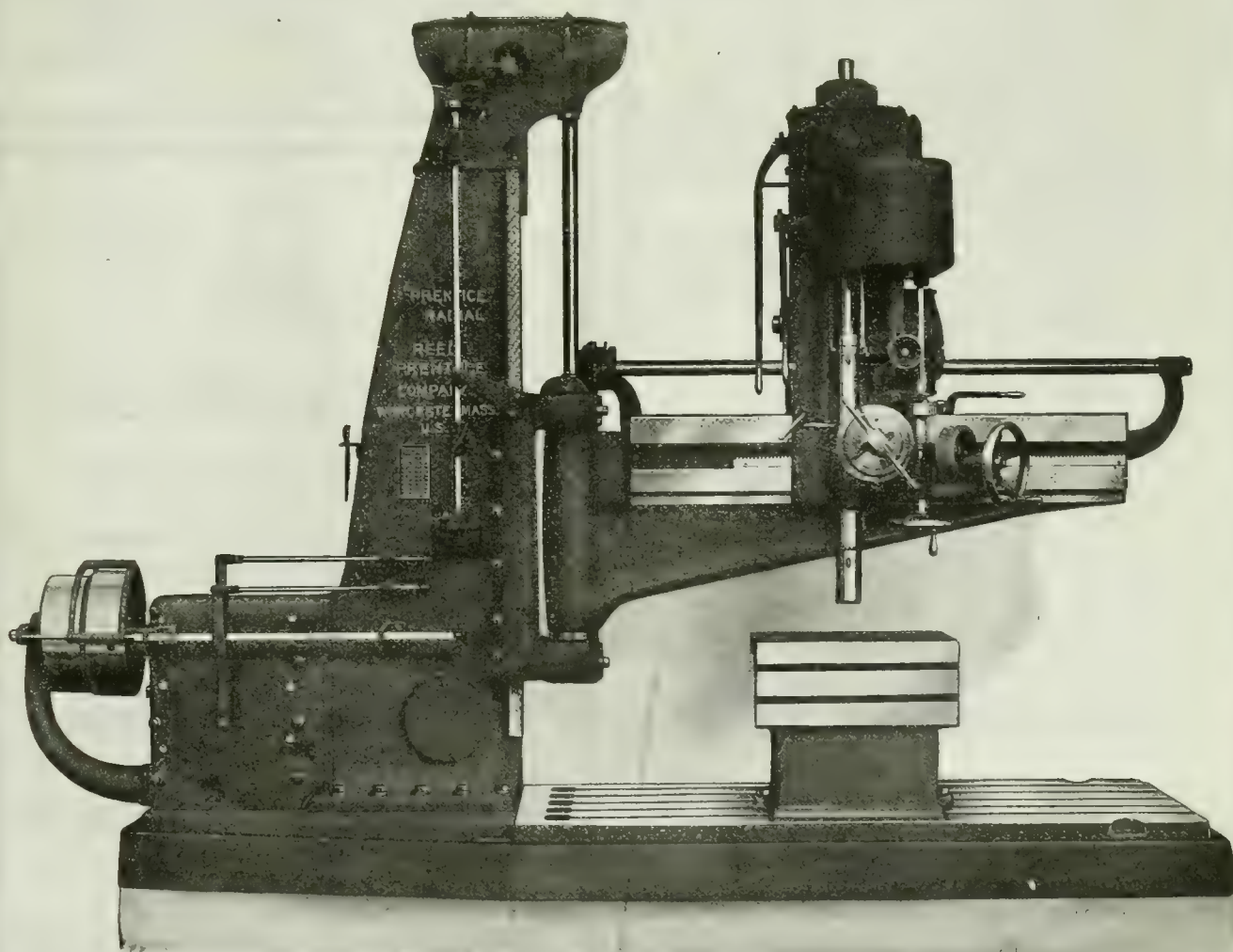
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FENWICK FRERES, PARIS



Notes on Grinding

NORTON COMPANY,
WORCESTER, MASS.

No. 394

The Right Abrasive for Grinding Glass

It is well known that Alundum, an aluminous abrasive, grinds better on materials of high tensile strength, and Crystolon, a carbide of silicon abrasive, is more satisfactory on materials of low tensile strength. In the case of glass we have a material that is, so to speak, on the border line. There are several instances where Crystolon is being used in one shop and Alundum in another on very similar work. Obscure differences in the grinding conditions or in the operations may make one of the two abrasives slightly superior to the other. The following examples, therefore, are only a guide as to the wheels and grain more commonly used on different kinds of glass cutting or grinding.

For deep, medium and fine mitres in rich cut glass "Alundum stones" have long proved to be without a rival. This same wheel is also remarkably successful in work on light ware or when used as an engraving tool.

Both Alundum and Crystolon grain are used for general glass roughing and for roughing mitres in cut glass with an iron wheel or "mill." Here, owing to their purity, the artificial abrasives proved their great superiority. There are no impurities in any quantity or large sized grains which are so apt to cause chipping and other troubles. Grain size 90 is commonly recommended for this work.

Crystolon is used extensively for beveling mirrors and plate glass and for many surfacing and edging operations. It is also used on many little known operations such as surfacing glass laps and grinding the seats of glass valve sockets.

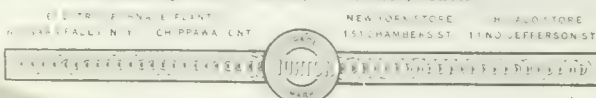
In the case of surfacing lenses or in squaring their edges Alundum is largely employed and some very remarkable tests have only recently been reported on this work. One lense manufacturer emphatically says "There will never be any more emery in our shop if we can get Alundum."

The use of Alundum and Crystolon on glass was chosen for the subject of this week's "Notes on Grinding," because this class of work is out of the ordinary and because we wished to emphasize that no matter how unusual your grinding or polishing operations are there is a correct kind and size of Norton abrasive to fit your requirements. Our Sales Engineering Department is able, by years of experience, to recommend what should be sent you on trial. Why should you not take advantage of this service? It has been responsible for cutting down the production costs in hundreds of shops. Why not yours?

NORTON COMPANY

Canadian Agents: The Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Ottawa, St. John, N.B., Winnipeg, Calgary, Saskatoon, Vancouver, Victoria. F. H. Andrews & Son, Quebec, Que.

Grinding Wheel Plants, Worcester, Mass.



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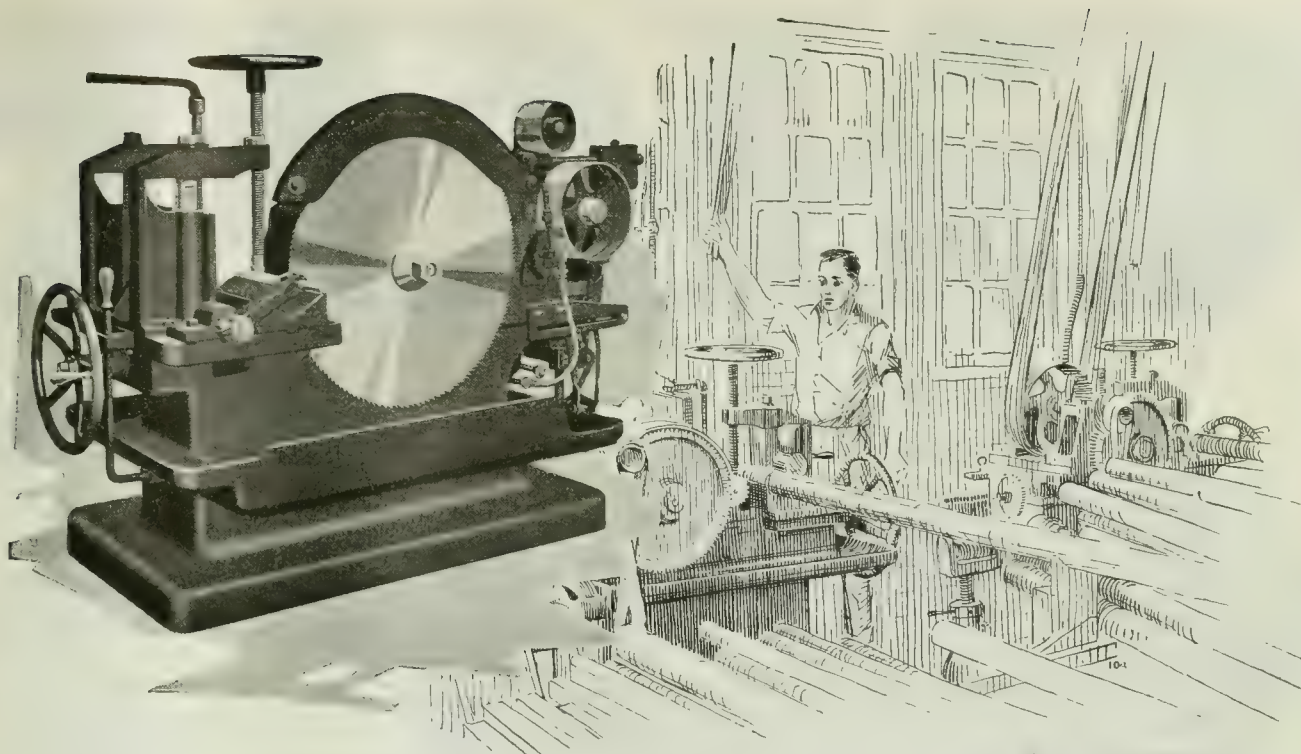
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Steel Economy

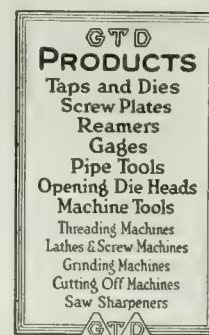
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The use of Nutter & Barnes Automatic Metal Cutting-Off Saw Machines in the steel shed effect a real economy in steel.

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On the other hand, they are big producers. Nutter & Barnes Cold Saws are used by some of the largest shops in the world. *They can help you!*



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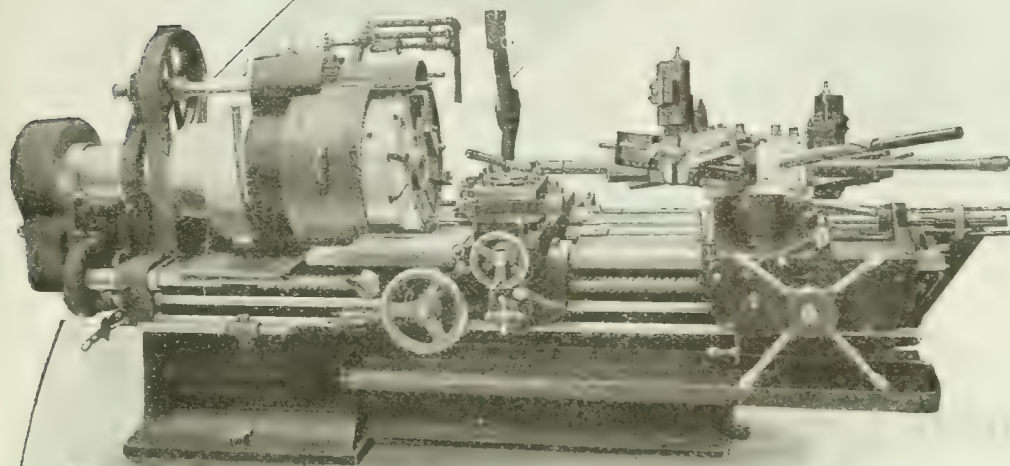
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Regarding this point there can be no question.

Gisholt Service, in the matter of company organization, satisfies by offering to users and prospective users of

Gisholt Tools the attention of Specialists trained to give every aid toward the solution of shop problems.

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Let this point sink in. Gisholt Turret Lathes are dependable to the "highest" degree. The good impression they make is **lasting**, rather than fleeting. They are machines one never tires of—machines one likes to give work to because of the assured production.

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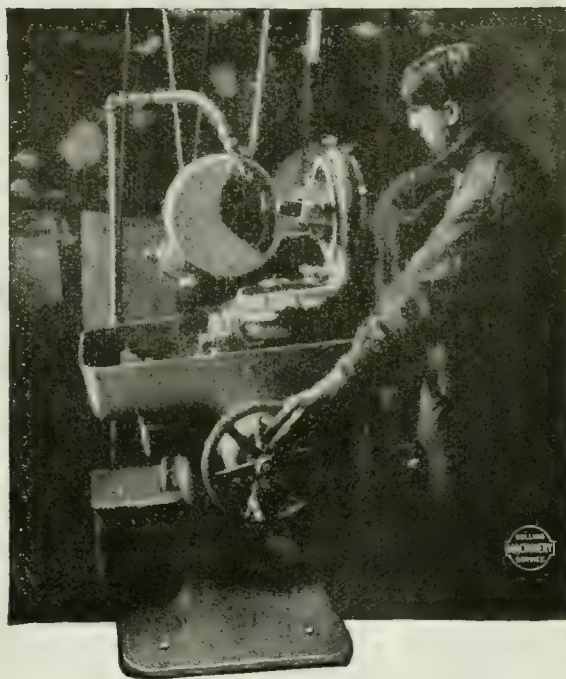
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The Jacklift and platform system in your plant means the easier handling of loads, the quicker movement of materials, less labor, greater economy and less possibility of accidents or damaged materials.

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A clear lift of $2\frac{1}{2}$ inches by four easy strokes of the handle operating an ordinary jack.

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Four times the handle movement means a lifting ratio of 1 to 35. A girl or boy can easily handle one of these machines with heavy loads.

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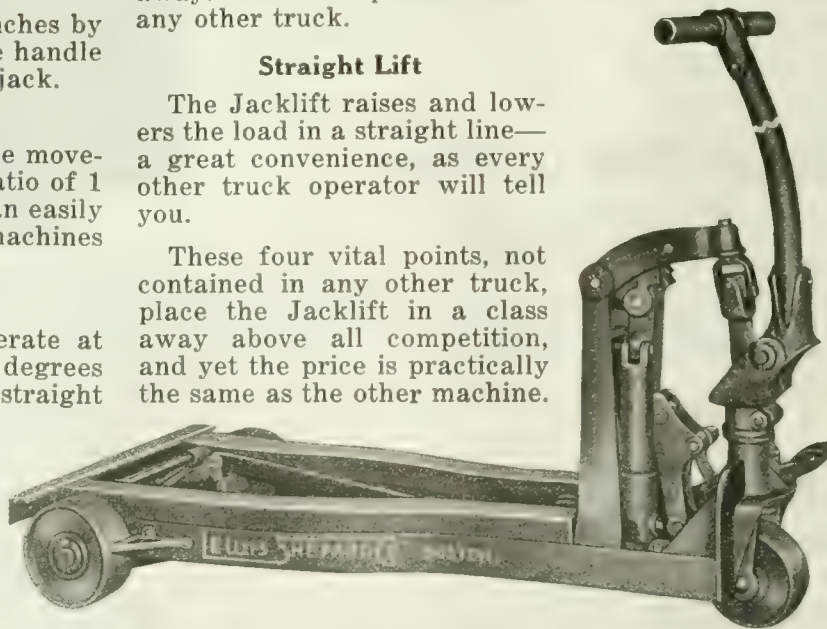
The handle will operate at any angle up to 90 degrees either side as easily as straight

away. This is impossible with any other truck.

Straight Lift

The Jacklift raises and lowers the load in a straight line—a great convenience, as every other truck operator will tell you.

These four vital points, not contained in any other truck, place the Jacklift in a class away above all competition, and yet the price is practically the same as the other machine.



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CANADIAN MACHINERY AND MANUFACTURING NEWS

Volume XXI. No. 14

April 3, 1919

The New Home of Pratt & Whitney Co., Ltd.

A Description of the New, Modern Plant at Dundas, Ont., Which is Specially Designed, and Arranged to Manufacture on a Greater Scale Than Ever Before, This Already Well-known Line of Small Tools, Etc.

By J. H. MOORE, Associate Editor CANADIAN MACHINERY

THE following article will be strictly a plant article, devoted to a general description of the construction of the building, its various features of more than ordinary interest, which show the care and amount of thought that has been spent on the layout of this new modern plant. Of course as can be surmised, the need of a new plant arose from greatly increased business, in fact the demand for the tools, gauges, etc., as turned out by this firm has become so pronounced that the present building now in operation has proved inadequate for the needs of the small tool industry, so this new modern building was the only solution.

The building itself is of flat slab reinforced concrete, together with brick construction throughout, and as the proper place to start a description of this nature is at the ground level, let us look at Fig. 1 and see the commencement of operations. From this view we glean a general idea of the style of base used for the pillars in the basement, the molds and their construction being clearly seen in the photograph. Fig. 2 takes us still a little further, and illustrates the basement in course of construction. The massive pillars are particularly noticeable, these being of hexagon design, and measuring 36 inches across the flats. The construction of the molds for the bays are also clearly shown, the distance between these bays being 25 feet. The

plant complete measures 175 feet by 75 feet, with two added towers for elevators, each 15 feet wide, making the building at these points 90 ft. wide over all. In addition to the basement there are three stories, each having a height of 15 feet from floor to ceiling. These floors will be described in due course.

At Fig. 3 we seen a decided change from photo No. 2, for things have now assumed a definite shape. It is hardly necessary to comment on this photo, for it is self-explanatory, and illustrates more clearly than written description

At Fig. 5 we see how the building looks after completion, as viewed from street. Attention is called in this view to two entrances shown in the foreground, one with steps leading up to the door, the other simply a large door with concrete sill. The first door spoken of is used to serve a double purpose, namely, as an entrance to the plant office, also as an entrance to the wicket of the parcel receiving and parcel shipping portion of the stock room. The door with concrete sill is utilized for purposes where express waggons or light shipping is done. Completely around the shipping portion of the building is laid a brick roadway, and for shipping heavier material there is a door at the ground level of freight elevator shaft, which can be opened when desired and truck backed in, when elevator can be stopped at same height as the truck and work is then easily passed from the elevator to truck, or vice versa as the case may be.

The Basement

Perhaps the best method of giving readers a detailed description of the interior of this plant would be to start at

the basement, gradually working up to the roof, so, commencing at the basement, let us see what we find.

The first thing particularly noticeable is the painting scheme adopted. The roof is painted a cream color, the walls to within about 3 ft. from the floor a light buff; the remaining portion to the floor is painted dark green, and the general



FIG. 5 -THE BUILDING AS IT APPEARS FROM THE STREET.

could ever accomplish, the general appearance of the building at this stage.

At Fig. 4 is shown an interesting view of the reinforcement bars, and the style of placing in position. This view was taken after the second storey was completed. The old building at present in use can be seen in the background of the picture.

effect is very pleasing. The cream-colored roof and buff walls present a good light appearance, while the green below harmonizes splendidly, yet will not get dirty as easily as the lighter color would.

Another painting scheme which is

ton freight elevator, the other a 2-ton passenger type. At all openings on each floor are installed safety gates.

Stock Rack Systems

The method of handling the stock in the basement is well worthy of attention.



FIG. 1 THE START OF BUILDING OPERATIONS

used to splendid advantage is that of painting the various type of pipes different colors. Wherever a pipe is painted red it denotes that such a pipe is a part of the sprinkler system which is installed throughout the entire building. White painted pipe illustrates that all such pipe contains electric wiring, and so on, each color having a particular meaning, which is illustrated clearly on blueprint made for this purpose. This scheme safeguards the possibility of tapping into a pipe expecting to find electric wiring, but suddenly finding that you have unfortunately tapped the sprinkler system, or perhaps the steam system.

Another point of interest in this portion of the building is the floor construction. This floor has a cement foundation with wood blocks bedded in tar for a walking surface. Such a floor as this is much easier on the feet than the usual cement floor generally found in a basement.

At one end of the basement is a room set apart for the millwright's use, where all supplies as required by him can be kept. There is also a large wash room with individual basins, each containing hot and cold water taps. In this room are also installed steel lockers for the workmen. This wash room feature is duplicated on every floor. The fittings in these wash rooms are away above the average usually found in such a plant as this.

There is also a slop sink on every floor where same can be used for the many purposes a fixture like this comes in handy for.

Another interesting duplication on each floor is the toilet installation. On each floor are two separate toilets, one for ladies, the other for gentlemen. The fixtures in these toilets are simply splendid, and each toilet is divided by a slate partition.

Elevators

Two elevators are installed, one a 3-

First the stock is brought in from the lack of the building so that it will not interfere with any other shipping, when it is placed in racks of special construction, in fact racks made specially for the purpose. These racks are made from channels and angle irons, held together by tie bolts. The construction is arranged so as to form passages about 9 inches square clear through the rack. Attached to each space is a raised stamp stating what size stock goes in that particular place. These stamps are placed on both sides of the rack so that stock can be withdrawn from either side. Another feature of these racks is that all material is classified and separated in a rather easy but effective manner. Wherever material is separated in sections the particular post or channel of the rack is painted white. This white post shows up very clearly, and the name of the

ment, for it will be but the matter of a moment to transfer the stock from the racks to the machines. On the other side of these cut-off machines will be placed steel bins, in which will be stored the various lengths of short ends. These bins will also have raised stamps on each bin designating the type of stock, and all particulars pertaining to the same. In this basement will be performed the cutting off, boring, and tapping operations. Butt welding will also be carried on in this department.

First Floor

Fig. 6 allows reader to form some opinion of the interior appearance of this floor, in fact the first and second floors are very similar in design, the only difference being that the factory offices are on the first floor, while the second floor is devoted entirely to manufacturing purposes.

Starting at the factory office. Here the offices are divided in the usual way by glass partitions into a private office for C. A. Fisher, factory superintendent, then into a general office, with enquiry wicket of unusual design. At this wicket visitors state their business, when, without rising, the girl in charge can control electrically the door leading into the aisle of the office. Such a feature is well worth while, for it prevents any Tom, Dick, or Harry getting into the office without proper permission. In conjunction with these offices is built a laboratory, where scleroscope, gauges, etc., will be kept to illustrate the actual tests made on the work as it goes through the plant without the necessity of going into the shop.

The Store Room

The store room on this floor is a department in itself. Here are placed in long rows steel drawers on one side and steel bins on the other. These drawers and bins are all numbered, and each section is given a letter of the alphabet, then



FIG. 2- AT WORK ON THE BASEMENT.

round machine steel, and so on are easily kept apart. This applies of course to the tool steel, etc., as well.

Directly alongside of the racks will be the cut-off machines. Such an advantage is easily understood and needs no com-

again each line of drawers or bins has a number. The whole system will be controlled by a card system with which you will be able at a moment's notice to ascertain the location of the piece, or pieces you desire. For example, suppose

we want a tap hob of some particular size and we find the card says section C, line 15, drawer No. 591. It is then an easy matter to locate section C, when line 15 will be seen plainly marked. Of course to find drawer 591 then becomes a mere detail. The same idea applies of course to the bins. All various tools or parts are classified under the proper head, and the system, when completely in operation, will be something to be rather proud of.

It will be noticed by readers that steel bins, etc., are mentioned, in fact the sheet steel idea is followed out exclusively, for all the index cabinets, desks, etc., in the office, are made from the same material. On this floor will also be placed the smaller automatic machinery.

In the photo No. 6 it will be noticed that there is an ice-cooled drinking fountain in the foreground. The four fountains are duplicated on each floor. Another feature which applies to every floor is the manner of controlling the lights. On each post is inserted a switch receptacle which controls the lights for each bay. Four 250 candle power lights, hung 2 ft. from the ceiling, provide the artificial light for each bay, so as can be surmised, at night the place presents a very well-lighted appearance. On each floor is also built a foreman's office as shown at the right of Fig. 6, and in this office is also contained a wash basin. There is also a dumb-waiter system installed connecting to the tool room, but this will be explained further along in the article. Reader's attention, however, is called to the shaft for this dumb waiter, which has the door open for illustrative purpose. This shaft is clearly seen at the extreme right of Fig. 6. It will be also noticed from this photograph that these floors are all hardwood, carefully laid.

its first operation, going through its various operations in sequence until finally it lands at the other end of the floor. From there it will be sent upstairs without any lost motion whatever. The operations conducted on this, the central and

trouble is eliminated, always of course excepting the cutting off of the power itself, for which there is hardly any remedy.

The Third Floor

The third floor is divided into various

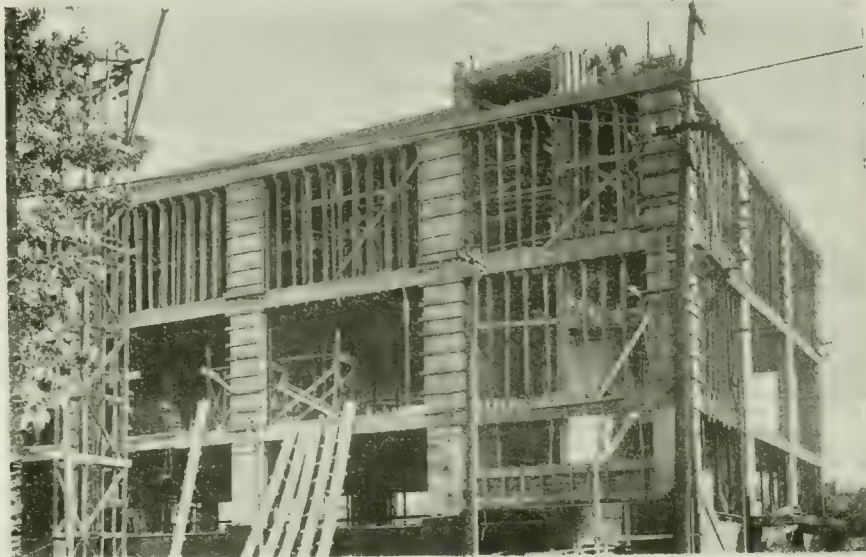


FIG. 3—THE BUILDING PARTIALLY COMPLETED

main floor will be as follows: Turning, milling, threading and filing; 90 ft. of filing bench will be installed at the finishing portion of this floor.

It might be well to mention that all hangers used in the power installation are of ball-bearing design and are painted a battleship grey on every floor. The novel method of motor installation on this floor is well worth a detailed description. The shafting on this floor is divided into two sections, each driven by a 20 h.p. motor. Hydro power is used. Should either of the motors give

departments in the following manner: Grinding, hardening, polishing, sand blasting, inspection and tool departments.

The grinding department will be equipped with dust exhaust pipe system, as also will the polishing department. The hardening department will be equipped with gas fume removing hoods. This hardening room measures 60 by 40 feet, and the floor is of wood block construction where the workmen will walk and brick construction where the furnaces will be installed. All the walls and ceiling of this department are painted dark green, and dark colored blinds will be installed, so that these can be regulated to suit the workmen in order that they can readily tell the true color of the steel being heated, thereby ensuring correct temper. Hardening furnaces will be all oil operated while the tempering furnaces will be the electric oil bath type.

Polishing Room

The polishing room is totally enclosed in glass and stands to the right of the inspection department, in fact the sand blast department, inspection and polishing follow in sequence. The idea of having the inspection department in the middle is easily surmised, for in such position it can pass the work to either the sand blast or polishing department as required. Sliding wickets are provided for this purpose. These wickets are also dust-proof, for each of these three departments are totally enclosed in glass, and dust-proof as far as it is possible to be.

Before going on to the tool room, let us follow up the routine of the work which, after being completed on the second floor, started to come up to this, the last floor. Immediately on arrival it is taken to the

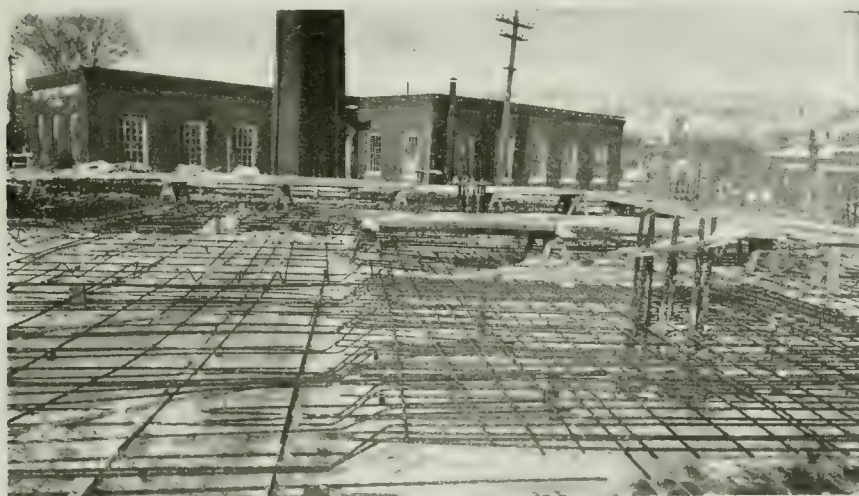


FIG. 4—A GENERAL VIEW OF REINFORCEMENT BARS TO FLOOR.

Second Floor

On the second floor the general building features are exactly similar, but the system of arranging operations is worthy of note. The stock will be brought up direct from the basement by elevator to this floor, when it will then commence

out the line shafts are so arranged that couplings, which are on the extreme ends of these shafts, can be connected in a few minutes, when the one motor can then drive the entire floor shafting until such time as the other motor is repaired. By this method all danger of power



FIG. 5 GENERAL INTERIOR VIEW.

inspection department before hardening. It then goes across the floor a distance of about 20 feet and is hardened, coming back again directly to the inspection. From here it goes to the grinding department and back to the inspection. From the inspection it goes to the sand blast or polishing department as necessary through the sliding wickets already spoken of, coming back once more for the final inspection. In other words, there is not a lost movement throughout the entire proceeding.

The Tool Room

In this department is placed a complete Bowser system of oil tanks, carrying the various oils used throughout the plant. Here also is the controlling board of the dumb waiter, and we had better go into this in detail to explain its safety features. At each floor is provided a steel door, which cannot be opened until the dumb waiter is at that particular floor, nor can the apparatus be started from any floor before the door is closed. These safety features can be easily appreciated. The whole system is first of all controlled from the tool room, but the



FIG. 7 VIEW SHOWING METHOD OF PLACING INSERTS.



FIG. 8 LAYING THE FLOOR OF THE FIRST AID ROOM.

carriage can be brought to each particular floor by a button designating the floor number, but the carriage cannot be sent up to the tool room. In order to have this done, the operator in the tool room must be called up on the speaking-tube, when he can then press the correct button to bring the carriage to his floor. Such a system entirely eliminates the possibility of accidents.

The Roof

Going up on the roof we see the usual type of flat design roof, but here also are the exhaust ventilators for the gas fumes from the hardening room, together with the dust extractor which was made by Pratt & Whitney's staff themselves. A description of this extractor would not be amiss. It measures 18 feet x 6 feet and is made entirely of sheet steel. It is divided into four sections, each section containing two long stop plates and two short top plates. Each section is also provided with dust-proof doors. Of course the action of the dust-laden air is

self-apparent. Coming through this extractor it continually meets these various stop plates where the dust is discouraged to go further, hits these plates, and drops to the bottom of the extractor. By the time the air reaches the end of its journey all the dust has left it, so practically free air leaves the ventilator on top. This extractor will only need cleaning about twice a year.

Up on the roof is also the elevator house where a platform is arranged, with railing, to facilitate oiling, yet making such operation perfectly safe. The blower for exhaust system is also installed in this elevator house. In regard to the heating system as installed in this plant, it is known as the Webster vacuum system and the blower used for the oil furnaces is that of the Spencer turbine type.

Other Special Features

We have purposely kept to the last two important features. First let us look at Fig. 7; this photo illustrates

Continued on page 327

A New Method for the Smelting of Iron Ores

Many Ores Are Not Suitable For the Blast Furnace, and the Following Article Describes a Duplex Process For the Making of Steel From Any Ore

By J. W. MOFFAT

CANADIAN iron ores in many cases do not admit of economical reduction in the blast furnace, and the physical state in which many of them are found is such that they would have to be briquetted before being introduced into the blast furnace at all.

A new method has recently been devised for the reduction of metals from their oxide or sulphide ores, which does not necessitate the use of the blast furnace, and which at the same time enables ores of any degree of fineness to be used. In principle it employs two present known furnace processes in combination. The first step is the reducing of the ore and its conversion into the metallic state, but in the form of sponge, as it is called. The next step is the transference of this sponge, either hot or cold, into the electric furnace, where it is melted down and finished. This process is particularly adapted to the manufacture of iron and steel and ferro-alloys.

The iron sponge is iron in a porous form, and a definition by Raymond states that is obtained by reduction without fusion. Its weight is about one-third that of cast iron.

The reduction of iron ores into this form has been attempted by the use of gas, but the success obtained has never been very great, as complete reduction was very seldom accomplished unless by the lengthening out of the operation. Not only was this the case, but accurate control of the heat was difficult and the sponge was liable to re-oxidize it when cooled or remelted if an oxidizing atmosphere is present.

These difficulties have been overcome by the aid of pyrometers for temperature control, CO. recorders for gas analysis and by the use of the electric furnace in which a reducing atmosphere is readily maintained.

The reduction of hematite iron ore (Fe_2O_3) is accomplished in stages, the first to magnetite (Fe_3O_4) which takes place from 300 to 450° C., and then to porous oxide (FeO) and finally to metallic iron, which takes place from 700 to 800° C., the iron then being in a spongy metallic state. The spongy iron thus formed is finally melted at a still higher temperature of from 1100° to 1300° C.

Previous Efforts

A number of attempts have been made to use sponge iron in various ways, a few of which may be noted. In Clay's process the reduction was effected in retorts made from fire clay, the ore having been mixed with carbonaceous material, the heat being applied externally

and the sponge iron product was then further heated and balled.

Newton also used a closed container in a somewhat similar way, heating it externally to a white heat for about 48 hours and taking the product while hot to a puddling furnace, or, when cold, to a crucible furnace.

Harvey devised a process in which coarsely ground ore mixed with charcoal was placed on inclined shelves within a puddling furnace in such a position that it was heated by gas entering the furnace. When reduced, the iron was worked up into puddled balls with the aid of further heat.

Roger mixed ore with coal and effected reduction in a rotating cylinder, heated externally; this he located above his puddling furnace into which the sponge was dropped, further heated and then balled.

A number of attempts have been made to use iron sponge in the crucible furnace. For instance, Beeford put a mixture of iron ore and carbonaceous material into a suitable container, heated it externally, and then transferred the sponge while hot into crucibles, thus melting it down. Later on he transferred it through a closed runner to a decarburizing chamber, where it was acted upon by decarburizing gases or steam. This was probably done to eliminate some of the carbon in the sponge. The utilization of the sponge has also been tried out in the open hearth furnace.

A number of other processes have been tried out for the using of iron sponge in the puddling crucible and open hearth furnaces, but all of them could only be considered as furnishing part of the metal used and all would certainly introduce more or less oxide into the bath of molten metal, thus increasing the finishing costs, for carbon dioxide in the furnace gases will oxidize iron sponges at as low a temperature as 300° C.

While the blast furnace at first glance might offer a means of working up the sponge, it has the serious disadvantage of oxidizing the already reduced sponge in the top part of the shaft. This action is due to the carbon dioxide, which is present in the blast furnace gases along with the carbon monoxide. This action would waste all the work previously done on the ore and the material would have to be again reduced in the reducing zone of the furnace.

In the author's process for which patents have been granted (Canadian patent No. 186,994, Oct. 15th, 1918, and U. S. patent issued Feb. 18th, 1919) for

the duplexing of a reducing furnace with an electric melting furnace it is immaterial how the sponge is made. The reducing furnace must suit the materials used for supplying the heat and the means of reduction for the most convenient and economical means in one locality may not be so in another.

With modern scientific apparatus reduction and the making of iron sponge is an easy operation to carry out successfully. Such furnaces should be mechanically charged, rabbed and discharged, and means should be provided for making small additions of carbon to the charge when necessary. Preferably the gases of combustion supplying the heat should not be passed over or through the ore being reduced. Stationary pyrometers should be provided which will indicate by colored flash lamps any variation up or down from the proper temperature.

With a properly designed furnace an intelligent laborer should be able to operate a number with resulting low labor costs.

Any electric furnace can be successfully used in the final melting down of the scrap.

Canadian Ores

Ores of high metallic iron content, say 65 per cent. and over in the crude state, are becoming increasingly difficult to get in Canada and the United States within a reasonable transportation distance of any market. One of the largest concerns in the United States catalogues the product of thirty odd mines, without showing one such ore, seven, however, range between 60 and 62 per cent. Outside of the Helen and Magnie mines of the Algoma Steel Corporation, the Atikokan Iron Co. and the Moose Mountain mine of the Moose Mountain, Ltd., the ore bodies in the older and more populous parts of Canada are not large, and are of low grade as a rule.

In Ontario, except the ones mentioned, no really large property has been thoroughly proved to contain one million tons of marketable ore, though there are a few of undoubted promise, such as the Canada Iron Mines' properties in Hastings County and the Belmont mine in Peterborough. There are, however, in Ontario many small bodies of ore situated conveniently to the market.

In the 48 years between 1869 and 1916 the Dominion Government reports show a total production of about 4,350,000 tons of ore in Ontario, an average of 90,625 tons annually, or a little less than 250 tons daily, an amount insufficient

to alone supply one very small blast furnace.

In the Province of Quebec from 1886 to 1916, a period of 30 years, there was a total production of 379,953 tons, making the yearly average 12,665 tons, or a daily average of 35 tons.

New Brunswick, in 68 years, 1848 to 1916, produced 272,850 tons, a yearly average of 4,013 tons, or a daily average of 11 tons.

Nova Scotia, in 30 years, 1886 to 1916, produced 1,279,637 tons, or a yearly average of 42,655 tons, or a daily average of 117 tons.

British Columbia, in 30 years, 1886 to 1916, produced 65,078 tons and exported practically all of it to the neighboring State of Washington. This tonnage is a yearly average of 2,170 tons, or a daily average of 6 tons.

The other provinces have done little or nothing in the mining of iron ore.

Dominion Government reports also supply other statistics of the total output of all Canada. For a period of 30 years the total production was 5,759,540 tons (2,000 lbs.), a yearly product of 191,985 tons, or a daily average of about 526 short tons, or 470 long tons, the latter being the ton used in the pig iron market. This 470 long tons of ore would have to carry about 55 per cent. of metallic iron to meet the supply required for only one small blast furnace, making 250 tons of pig iron daily, which is one-half the size of what is considered a good furnace to-day, when they are being built to produce up to 600 and 700 tons of pig per day.

In 1916 the United States produced about 75,500,000 tons of ore, the population being about 100,000,000; this is equivalent to 75.5 tons per 100 of population. The same year Canada produced from her mines 340,000 tons, or 4.25 tons per 100 of population, or about one-seventeenth of what the United States did.

This is a poor showing, particularly when it is remembered that the great producing iron ranges found in the States of Minnesota, Michigan, and New York are also found in Canada, and that the last twenty years include what is called "Canada's growing time." There are undoubtedly many reasons why such a state of affairs exists, some can be removed by legislation, but the great cause of this poor showing is that few of our mines with convenient shipping facilities can produce even 100 tons per day, and the great majority of all Canadian ores unfortunately require crushing, grinding and concentration with subsequent briquetting to render them acceptable to blast furnace operators, and it is this cost of briquetting which finally proves to be the last straw.

The Canadian blast furnace operator is able to deal with one American selling agent for his entire requirements for a year's run, feeling absolutely sure of its delivery to him and of its being, according to the analysis, guaranteed at the time of its selection. Another factor

which enters into the ease with which American ores can be used is the almost negligible duty of eight cents per ton and no war tax. English ores can be imported still more cheaply as regards duty as the amount in this case is only six cents.

The best solution tending towards the utilization of Canada's resources would seem to be the operation in some profitable manner of the many small iron mines, such as are to be found between the Lake of the Woods on the west, all the way down the north shore of the Great Lakes water system to the Straits of Belle Isle on the east. As there are very many large water powers available for the generation of electricity at points sufficiently convenient for the transmission of power to suitable smelting locations, the past difficulties can be largely overcome by a reversion to the use of the iron sponge of the ancients, melting it in the very modern electric furnace with its ideal conditions for that work, and without removal, finishing the metal into any desired iron or steel.

Marketing the Product

It is hardly to be expected that the electric furnace can market ordinary pig iron in opposition to that made in the blast furnace, except under most unusual conditions, such as a very long haul from the blast furnace to that market which may be adjacent to the electric furnace. Low phosphorous high silicon pig iron, however, could be made for sale to the open hearth steel furnaces and some washed metal (metal with the phosphorous sulphur and silicon practically eliminated) and other special irons would have some market.

The natural product of the electric furnace is steel, however, and to that metal is its work advantageously confined from a financial point of view. It is particularly well suited to the furnishing of the molten metal in a steel foundry, but this class of work is only prosperous in the centres of large population, and most of our smaller iron mines are situated at some distance from the cities.

During the war there was a ready market found in casting ingots for the forging of shells. The war taught us new possibilities, and if existing forging and rolling mills are not disposed to continue that practice, the electric furnace plants could cast ingots, crop them (remelting the cropped ends with the iron sponge of the next heat) and ship the ingots to a distant forging works or rolling mill which they themselves had combined to build and operate. A plate rolling mill would find a ready market for its entire output in Ontario, for instance. Rolling billets, too, would probably be satisfactory. Electric furnace steel, owing to its superior quality, will always find a sale in competition with other steels and at a higher price even when steel of high quality is desired.

Under the new process the ore should be crushed fine enough to effect the best magnetic separation of the iron oxide

from its associated gangue, usually silica. It is rather expensive to get rid of rock material by means of slags made in the electric furnace, and an ore should be concentrated up until it carries as high a metallic iron content as possible, over 63 per cent. say, though no hard and fast rule can be laid down, as it all depends on the analysis of each ore.

For reduction purposes, the carbonaceous material should be ground to the same size of grain as the ore and should be very thoroughly mixed with it. Its analysis should show the weight of fixed carbon and volatile matter, moisture, and ash. Theoretically the metallic iron should have one-quarter of its weight of fixed carbon present for its complete reduction, but in practice a further small percentage is added. For example, 1,000 lbs. of 65 per cent. iron ore (Fe_2O_3) has 650 lbs. of metallic iron and theoretically requires 162½ lbs. of fixed carbon for complete reduction which would be found in 275 lbs. of charcoal showing 60 per cent. of fixed carbon in analysis.

Limestone, also finely ground like the concentrates, may be mixed in the charge and will be calcined in the process, or it may be added as lime in the electric furnace. There should be enough lime present to make a very basic slag in the electric furnace.

The iron sponge may be handled hot or cold. When transferred hot, the reducing furnace should be provided with means for discharging its contents into containers having air-tight valves, taking every care that air is not allowed access to it during the discharge. The containers must be discharged into the electric furnace with like care and preferably through the roof, the furnace having been previously rendered airtight. The current can then be put on and it will be noticed that the charge will carry the current steadily at once without the very objectionable surging found in melting cold scrap. Indeed, if the sponge is only reasonably warm this will occur and the running will be smooth.

The reducing furnace may be provided with a large air-tight cooling chamber underneath, into the top of which the iron sponge may be dropped when reduction is complete. When this chamber is constructed to hold the product of several runs, it becomes a storage bin as well, with the lowest charge cooled below the oxidizing temperature, but still being warm it can be transferred without care and be charged into the electric furnace through its regular doors.

In the case of a low grade hematite or a mixed hematite and magnetite ore, which ores do not answer well to magnetic concentration, a partial reduction to Fe_3O_4 will render it well suited as a rule.

The heat required for the chemical reactions can be either secured by burning coal or coke on a grate or by using these in powdered form, blown in with air to

a combustion chamber or by using liquid fuel, such as fuel oil. The burning gases from any of these fuels should heat externally the container in which the work of reduction is being carried on, but preferably should not be allowed to enter it. If electric heat is used it can be applied in the same chamber as that in which reduction is being carried on.

The operation of the electric furnace in the melting down of the sponge is practically the same as in the melting and refining of scrap.

In the Swedish electric furnace (Electro-Metals Co.) it requires about 1.1 k.w. hours of power to produce 1 lb. of metal and the metal is a white iron only. This is equivalent to 2,200 k.w. hours for a net ton. It is transferred while liquid to an electric furnace, where about 300 k.w. hours of additional energy are required to finish the metal into steel, making the total energy used about 2,500 k.w. hours from ore to steel.

Properly reduced iron sponge melts as readily as scrap, which can be melted and finished in good practice with 700 or 750 k.w. hours per ton, but as the rock material remaining in the iron concentrates will frequently necessitate a larger amount of lime to secure a very basic slag, the amount of slag used in the iron sponge process will be somewhat greater than in the scrap melting process. A fair average will be 800 k.w. hour with the sponge process, or about one-third the amount required by the electric process used in Sweden.

In this new process no high temperature heat is lost in waste gases leaving the electric furnace, as there will be practically no gases generated there, and compared with other processes using 1,700 k.w. hr. of energy more than the iron sponge process, which employs heat obtained for reduction from fuel, the economy in the process is readily seen. A six-ton electric furnace will require the iron sponge made from about 10 tons of 63 per cent. Fe concentrate per heat. Four heats can be easily made in 24 hours and a skilled operator could get five if the plant were suitable. Taking the number of heats at four a six-ton furnace would then readily produce 24 tons of liquid steel in 24 hours, and would require 60 tons of 63 per cent. Fe concentrates. If the ore mined would need concentration of $1\frac{1}{2}$ into 1 to produce 63 per cent. Fe concentrate, one six-ton furnace would use 90 tons per day of such crude ore.

Owing to the existing instability of prices of materials and to the labor unrest, it appears to be quite inadvisable to make any attempt to quote an average cost for either plant or product—a cost quoted to-day will probably be useless a few months hence. Iron sponge, however, will cost less than scrap as soon as the war scrap is all used up.

The following are the main claims granted in the patents issued to the author:

1. A discontinuous process of treating metallic oxide ores which consists in reducing a charge of ore without fusion in

a suitable furnace, and, after reducing, excluding oxidizing gases from contact with the charge, while its temperature is above the lower limit at which re-oxidation can take place, placing the reduced charge in a separate electric furnace and fusing it there in an inert or reducing atmosphere.

2. A discontinuous process of treating metallic oxide ores, which consists in reducing the charge of granular ore without fusion in a suitable furnace, and at as low a temperature as possible to maintain the granular form of the reduced ore, and after reducing excluding oxidizing gases from contact with the charge while its temperature is above the lower limit at which reoxidation can take place, placing the reduced charge in a separate electric furnace and fusing it therein in an inert or reducing atmosphere.

3. A discontinuous process of treating metallic oxide ores which consists in reducing a charge of ore without a flux, without fusion in a suitable furnace and after reducing, excluding oxidizing gases from contact with the charge while its temperature is above the lower limit at which reoxidation can take place, placing the reduced charge in a separate electric furnace and fusing it therein with a flux in an inert or reducing atmosphere 4, 5 and 6, cover the cooling of the charge after reduction and before fusion to a temperature below that at which reoxidation can take place as already set out in 1, 2 and 3.

NEW HOUSE OF PRATT & WHITNEY

Continued from page 324

clearly the system of inserts as provided in the ceiling of each floor every 3 feet apart. By means of these inserts, which take the form of fastening bolts, together with 3 in. channels placed lengthwise and crosswise, hangers for the various countershafts can be placed to within a square inch of the desired position without any trouble or hole-boring in the ceiling. This idea is a decided improvement over the old-time method.

First-Aid Room

Last, but not least, let us refer to Fig. 8, which illustrates the laying of the tiled floor in this very necessary department. This room is part of the second or main floor and is placed in this central position for convenience. The complete room is painted white, and of course, as can be seen, the floor is tiled. Foot bath, wash basin, in fact all necessary equipment will be installed in this room, where good medical attention will be secured.

Taken in all, this plant is modern in every respect, for cement stairway with railing, fire doors on every floor, sprinkler system throughout, and all other up-to-the-minute fixtures are installed. In a later article we hope to show readers of CANADIAN MACHINERY the placing of the new machine equipment, together with some of the most interesting operations throughout this plant.

FLUE TEMPERATURES

The temperature of the gases in the uptake or smoke flue affords a useful indication of the economical performance of the boiler, although it sometimes requires skill and experience to interpret the temperature readings correctly. An unnecessarily high temperature in the flue usually indicates poor economy, because it shows that a considerable quantity of heat that should be absorbed by the boiler and utilized in the production of steam is being poured into the stack wastefully; but a low temperature does not always indicate good economy, because it may be due to leakage of air through the setting or through some of its connections, or to imperfect combustion in the furnace, accompanied by extensive distillation of combustible gases in the unconsumed form.

At the moment of their emergence from the boiler, the flue gases must necessarily be somewhat hotter than the boiler or its contents, and in the best boiler-room practice the flue temperature is usually from 500° to 600° Fahr. When a materially higher value than 600° is observed, the conditions that lead to it should be investigated and remedied, because neglect to do so is likely to result in a large and probably continuous waste of heat. When the combustion is effected by means of an ordinary chimney or stack, a certain temperature in the escaping gases is essential to the realization of a proper draft. If the chimney and the other parts of the installation are correctly designed, the draft should be good with a flue temperature of 500° Fahr., as indicated above, unless the boilers are heavily overloaded; but good natural draft can rarely be had with a flue temperature materially lower than this. A high flue temperature may be due to any one of a number of causes. The boilers are perhaps being forced beyond their normal capacity, so that the flow of gas is too rapid to permit a proper absorption of the heat; or they may have become thickly coated with sediment and scale internally, so that their heating surfaces are not in good contact with the water; or they may have become covered, externally, with a coating of non-conducting soot and dirt.

Closing the Plant.—The Canadian Steel Foundries, Welland's largest industry, has closed and when it will open again no man can prophesy. "Every order we have on hand will be completed by Saturday," said R. S. Hart, manager, "and we have no other course open to us. We have done everything within our power to keep the plant in operation, but we have not succeeded. What foundry work is available will be done at our plant at Longue Pointe." The Welland plant normally employs between six and seven hundred men, though that number has been much reduced in the past three months.

Types of Electric Furnaces—1: the Rennerfelt

The First of a Number of Articles Dealing With Various Types of Electrical Furnaces in Successful Use in Metallurgical Industry—
The Electrical Characteristics of This Furnace Are of Interest

By W. F. SUTHERLAND.

THE Rennerfelt electric arc furnace was developed by Rennerfelt in 1912 and is now in successful use for melting steel, cast iron ferro-manganese, nickel, copper, bronze, brass and aluminum, etc. It is of Swedish origin, the inventor, Ivan Rennerfelt, having conducted the experiments which led to its successful development in Sweden. The earlier Rennerfelt furnaces were built of the square or rectangular type, while others were of the later round type with domed roof. Standard practice with the manufacturers now is to use the round shell with a removable dome-shaped roof. This improved design results in a better heat distribution and a more accessible hearth. Relining is also greatly simplified.

Originally, all furnaces, even the largest types, were tiltable about central trunnions, and the tilting was accomplished by rack and pinion and worm gearing. This construction is now only adopted in the smaller sizes, the three ton and larger sizes now being tilted by means of a cradle and rack. This construction permits of a much smaller movement of the pouring lip and where even this amount of movement is inadvisable it is possible to support the furnace by means of trunnions immediately under the pouring lip. In the latter construction as well as in the other arrangement the actual tilting of the furnace is accomplished by means of motors suitably controlled.

Operating Characteristics

The Rennerfelt furnace, while drawing a three-phase current from the

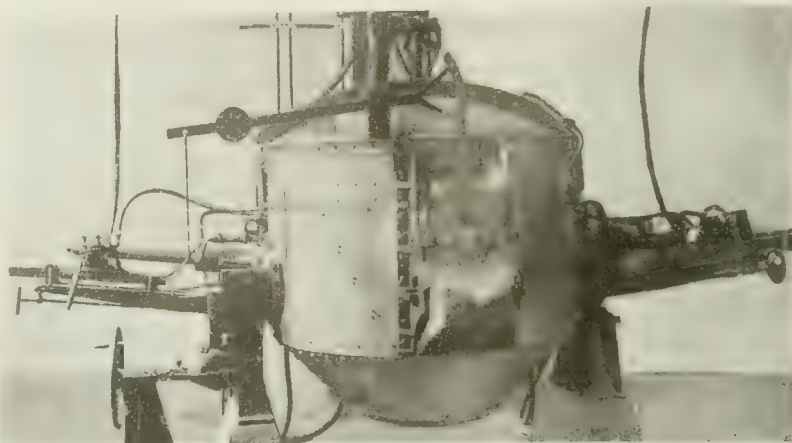
trodes. The now well known connection devised by F. C. Scott for transforming three phase current to two-phase is used for this purpose and reference to the accompanying diagram will make the connections employed understood.

The vertical electrode is the common return for both phases and carries 1.41 times the current carried by either of the side electrodes. The voltage employed between the centre and the side electrodes is about 100, and for steel the makers have arranged, on the transformer, for a reduced capacity voltage tap to give approximately 65 volts on the low tension side. This arrangement is of the utmost importance during refining, as the furnace will work more efficiently as an arc resistance type furnace at the lower voltage. At the same

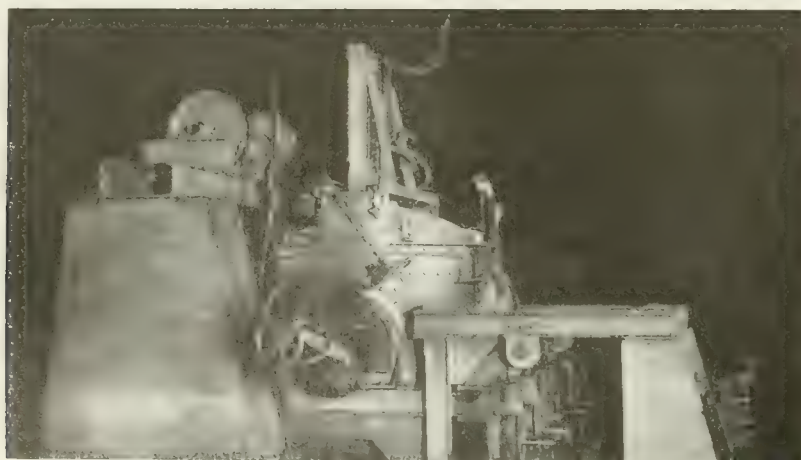
burn out the lining. It is therefore of importance to reduce the power input from the transformer bank to the furnace, and, as mentioned, this is now done by means of taps on the transformers and not by introducing extra reactance. The reactors, which are now usually inserted on the high tension side of the transformers, are used to facilitate starting, but, due to the fact that an increase in reactance is liable to lower the power factor, it is not good operating practice to run the reactance in the circuit for any length of time. Reactance is occasionally employed in the low tension side in the larger installations, where the incoming line voltage is comparatively low.

The arc is formed between the tips of the three electrodes and on account of the two-phase current employed and the arrangement of the electrodes is thrown in a downward direction, thus creating a very intense heat where most needed, on the top of the bath itself. Thus while the arc is free burning the heat is directed where needed and a powerful heating effect secured. The character of the arc, by means of which it needs no conducting path through the metal, enables the bottom to be sintered in with little or no trouble.

It has been found that the highest efficiency and best working conditions in the Rennerfelt furnace are obtained at a certain and constant distance between the electrode tips and the top of the charge. For this reason the electrodes have been made tiltable in a vertical plane. Problems of design in connection with the maintaining of an airtight furnace have been satisfactorily overcome and specially designed stuffing boxes, external to the shell, allow the electrodes to be tilted at their maximum angle without leakage.



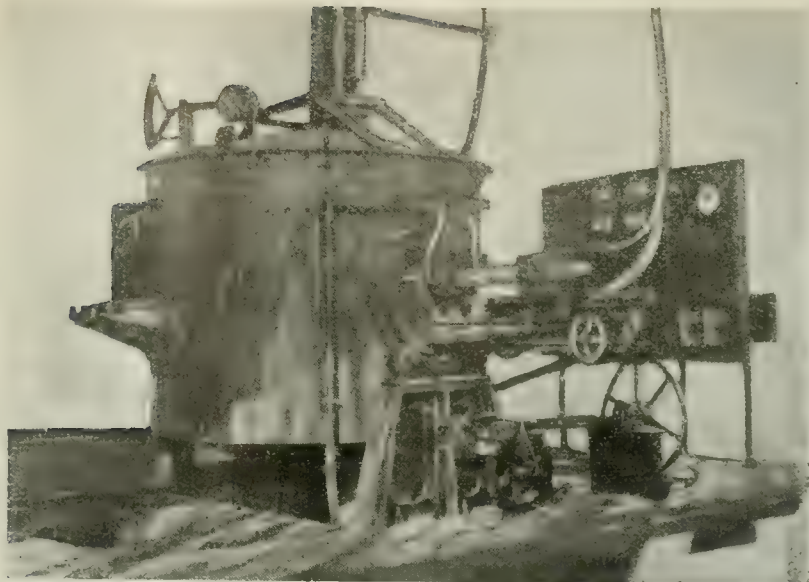
1,000-LB. FURNACE, FRONT VIEW



1,000-LB. FURNACE IN UNITED STATES MINT

mains, differs from other makes of furnaces used in the metallurgical industries through the arrangement of and method of supplying current to the elec-

time it is evident that the same power input will not be required during the refining period as in the melting down period and excessive power would only



TILTING MECHANISM AND CONTROL

The tilting of the electrodes has introduced an important advantage. When in their lowest position arcing to the slag can take place. By this means the furnace can work as an arc resistance furnace with the slag and metal as part of the circuit.

The free burning arc for melting cold scrap will assure an even and steady operation with a current in the high tension leads perfectly balanced and of high power factor. Automatic electrode control can be used at the beginning of the melt.

If any amount of refining is to be carried out in the furnace the electrodes are tilted at the necessary angle and the furnace worked as an arc resistance furnace. The makers state that this feature is of importance in the desulphurizing period in basic operation, especially where a heavy white slag is used as in tool steel. The use of a carbide slag is made possible instead of a ferro-silicon slag at a considerable saving.

Linings

For use in the steel industry, either acid or basic linings can be used to suit conditions encountered. For basic operation the bottom consists of magnesite brick, on the top of which is the usual fused or sintered lining of dead-burned magnesite. The side walls are made of magnesite brick up to or a little above the slag line. From there up silica brick is used. It is economy to use cheaper brick of neutral characteristics for the outer layers on the bottom and sides where the heat is not so intense and the basic characteristics of the magnesite are not needed.

For acid operation the bottom is made of silica brick with a rammed-in lining of gannister on top. The walls are made of silica brick. The roof is always made of 9 in. special silica brick. Since there is only one small hole in the roof and since it is of comparatively short radius, the maintenance costs are low and the inevitable expansion of silica brick is

taken care of. A spare roof frame is furnished and a new roof may always be kept in reserve, making the replacement time less than one hour.

The life of the refractories is usually in the neighborhood of 250 heats for the roof and slightly more for the walls. No trouble is experienced with the bottom, which only requires an occasional patching and will last indefinitely if properly cared for.

The linings used for non-ferrous metals are in some cases different from those usually met with in steel practice. For copper, red brass, cupro nickel,

cent. tin, and 7 per cent. zinc, a bottom constructed of carborundum sand, mixed with fire clay and molasses for a binder was used with Chicago fire brick for the side walls and roof. This lining has lasted for 300 heats and it is claimed will be good for many heats more.

For the melting of aluminum a basic bottom has to be employed, made up of magnesite bricks with a fused-in magnesite lining. From the slag line up the furnace should be lined with fire-brick. It is essential in melting this metal to avoid any contamination with silica and for this reason no silica brick is used in the furnace.

Power Consumption

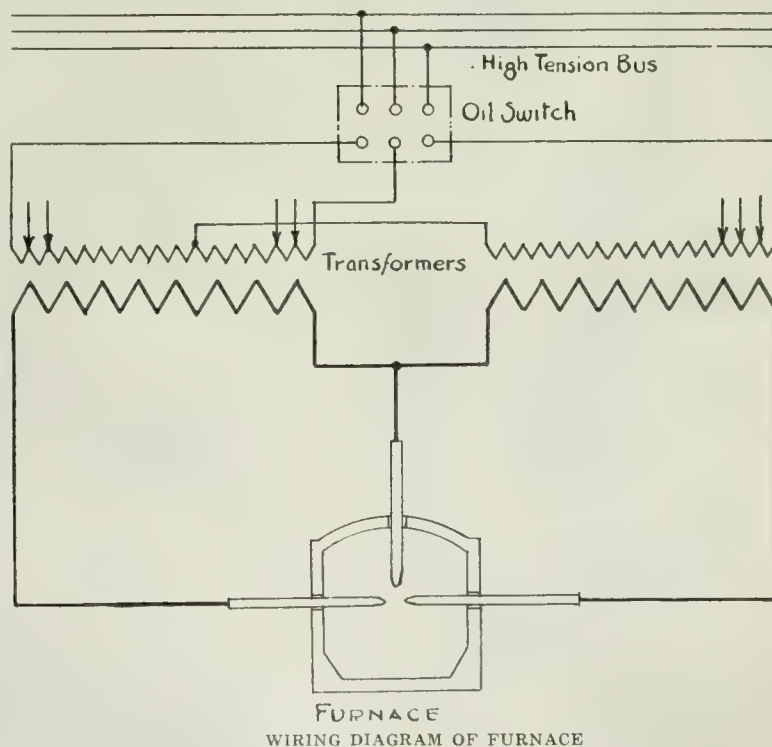
The makers of this furnace, Hamilton and Hansell, Inc., New York, have kindly furnished the following figures relative to the power consumption on various classes of work, which must, however, be read with the knowledge that variation is to be expected in this respect according to the class of work being done.

Power consumption and length of heat for four heats on steel castings, acid lining used and furnace operating only in the daytime:

Heat No.	Charge	Time	Kw. hrs.
1	1900 lbs.	4.00 hrs.	800
2	1800 lbs.	3.40 hrs.	520
3	1825 lbs.	3.26 hrs.	520
4	1800 lbs.	3.05 hrs.	490
Total	7325 lbs.	14.11 hrs.	2330
Aver.	1831 lbs.	3 1/2 hrs.	Per ton 637

The electrode consumption using Acheson graphite electrodes varied from 9 to 11 pounds per ton.

Another installation averaged 700 k.w. hr. per ton where no refining was re-



bronze and silver, a gannister bottom is used, with silica brick sides and roof, while for bearing metal composed of 82 per cent. Cu., 5 per cent. lead, 6 per

quired and about an additional 100 k.w. hr. for each slag taken off. These last results were obtained by continuous operation.



FURNACE AND CONTROL PANELS

For the non-ferrous metals the following data are of interest:

Cupro-nickel (75% Cu, 25% Ni) in 1000-lb. Furnace	
No. of pounds per heat	1,000
Kw. hr. used per ton	500
Time per heat	90 min.
Approximate loss	32%
Bronze (95% Cu, 4% Zn, 1% Sn.) in 1000-lb. Furnace	
No. of pounds per heat	1,000
Kw. hr. used per ton	300
Time per heat	65 min.
Approximate loss	32%
Melting Silver Dollars in 1000-lb. Furnace	
No. of pounds per heat	1,000
Kw. hr. used per ton	200
Time per heat	65 min.
Approximate loss	05%
Bearing Metal (2000-lb. Furnace)	
Total metal charged	5,048 lbs.
Total metal recovered	7,980 lbs.
Loss	68 lbs. (.845%)
Kw. hr. used per ton (average of 116 heats)	360 kw. hr.

This includes pre-heating, testing and melting. Average time for making one complete 2,000 lb. heat from charge to pour, 90 minutes; in other words, 12 minutes for charging, 70 minutes for melting and 8 minutes for pouring. Electrode consumption, based on 104 tons of charge, using Acheson graphite electrodes, 5½ lbs. per ton.

Rating and Transformer Capacity

The Rennerfelt furnace is manufactured in the following sizes and the transformer capacities given are advised for the various sizes.

Capacity.	Transformer rating, 40° C. rise normal rating
100-200 lbs.	40-60 Kva.
300-500 lbs.	80-100 Kva.

1,000 lbs.	150-200 Kva.
1 gross ton	300-400 Kva.
4-4 gross ton	800-1000 Kva.
5-6 gross ton	1200 Kva

The makers give a comprehensive statement of the characteristics and salient features of the Rennerfelt arc furnace as follows:

The heat is generated with an arc with the absence of excessive strain on the power supply.

The high tension current may be of any cycle and voltage, either two or three phase, and is perfectly balanced on all three phases, if three phase current is used.

The arc is independent of any metal in the furnace and therefore can be regulated more easily with better control of the temperature.

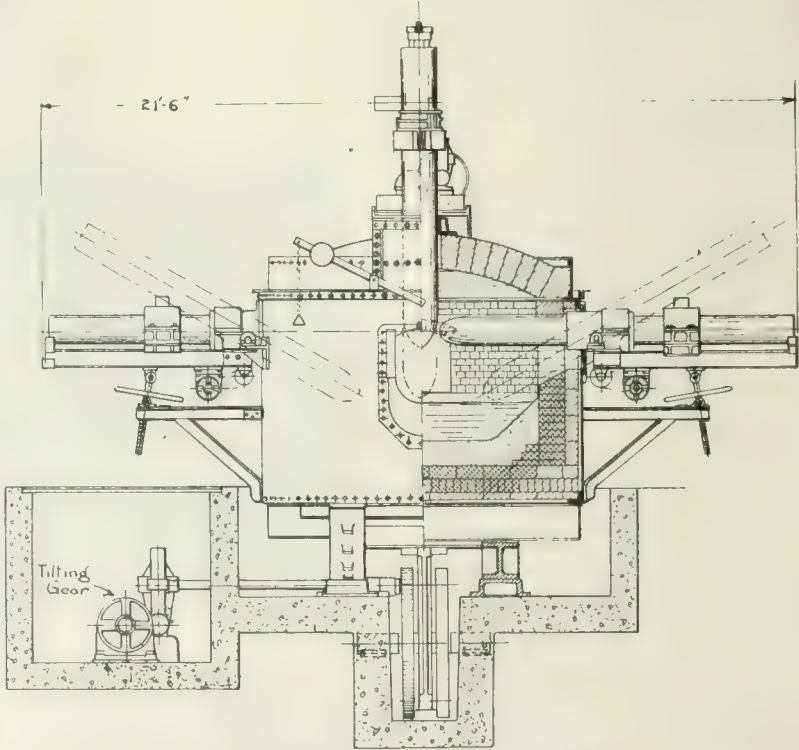
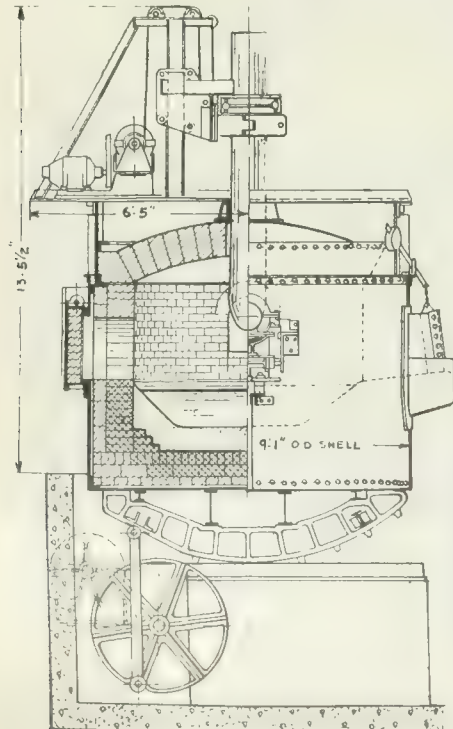
The arc is thrown violently downwards, and being a radiating arc of large volume, favors a high efficiency and the roof has a long and satisfactory life.

Due to the arc being free burning, the automatic side electrode control can be used during the melting down period without violent fluctuations in the power output.

The power factor is high—about 90 per cent. with 60 cycle current.

There is only one small hole in the short radius roof, the short radius roof and the single hole both making for strength and low maintenance cost.

A very important feature of this furnace has to do with the possibility of preheating the furnace with the free-burning arc and the bottom can be sintered in by this means without the use of coke, oil or other material. No trouble is experienced in getting contact as the arc is drawn between the tips of the three electrodes and cold scrap is never used as part of the circuit.



CROSS AND LONGITUDINAL SECTIONS OF 3-TON FURNACE, SHOWING ELECTRODE ARRANGEMENT

Canadian Machinery Drafting Course—Part I

This Series Will be Issued Every Two Weeks—In Each Section Will be Shown Some Problem, or Plate, For the Reader to Work Out—A Prize Will be Given to the Three Best Plates Sent in Each Issue, so Here's an Opportunity—Get Busy and Send Your Plate Along to Our Editor

By J. H. MOORE, Associate Editor CANADIAN MACHINERY

BEFORE entering upon this series of talks or lessons, on the art of mechanical drafting, the reader must not imagine that here commences a slow, painstaking, thorough course on the subject already mentioned. While such a course would be a boon to many, yet the average reader would not follow such a detailed course, which, to cover the subject properly, would span over a space of from three to four years. Not only would the average reader drop out of line before this time, but to the machinist apprentice especially, such a detailed course would not appeal, for included in a complete study of the drafting business would be many things not of especial appeal to him.

We will try, therefore, to only touch on the most essential points as we go along, keeping in mind that this is a course specially arranged to meet the requirements of the machinist apprentice, in order to illustrate to him the basic principles of mechanical drawing, and its application to the working drawing.

We will work up gradually from the straight line problem into the actual assembly drawing, but will go to such a stage by easy steps. We want the apprentice to feel that here is a course specially arranged for him, and should he get puzzled at any time that we will be only too willing to answer him, and lift him over the difficulty. Close study to this course should increase the earning power of the student, and besides,

Mechanical Drawing

To put it as briefly as possible, mechanical drawing is the method of showing graphically the intricate details of machinery. It is, so to speak, the language by which the draftsman speaks to the workman. A brief study of a well-executed drawing gives a much better idea of the machine portrayed, than a long-winded verbal, or even a detailed written, description would ever do. In fact the better and clearer the drawing is made, the easier the workman can comprehend the ideas of the draftsman.

A neat drawing for instance was never made by a careless worker, nor even by a good draftsman, with poor instruments, but as you seldom see a good designer with poor instruments one can usually tell the character of the draftsman, by his style of drawing.

To the beginner, however, a cheap grade of instruments would suffice, but as he becomes more expert, he would do well to secure a better grade of tools. In fact if one can afford it, the best plan is to purchase the better grade right at the start, but this is simply a matter which rests with the student himself.

Instruments and Materials

First comes the question of paper. In selecting drawing paper, the first thing to be considered is the kind of paper most suitable for the proposed work. As we are principally interested in the needs

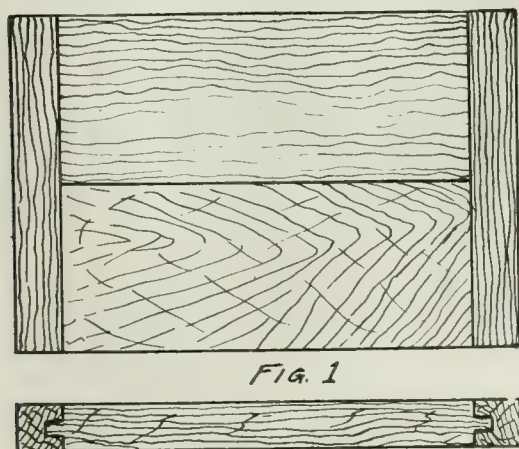
To keep the expense item down to the lowest possible figure, we will call for sheets $9\frac{1}{2} \times 13\frac{1}{2}$ in. in size. This allows students to purchase their paper in what is called the Demy size of sheet, this being a sheet 15 in. x 20 in. By careful cutting you have two sheets from each large one, 10 in. x 15 in., sufficient size to cover the work. Whatman's paper is considered by many the best grade of paper, and either the cold pressed, or hot pressed, will answer the purpose. The hot pressed paper has a smoother surface, but does not stand erasures as well as the cold pressed sheets, so it might be well for readers to get the tougher material, for no doubt there will be considerable erasure made at the beginning.

Drawing Board

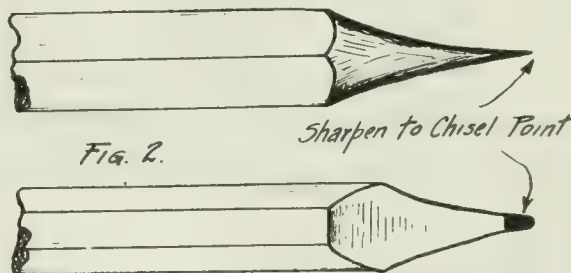
The drawing board, Fig. 1, is usually made of well seasoned, and straight grained soft pine. Each end is protected by a side strip, usually about 2 in. wide. This strip is trued accurately to suit the T-square, but as students will more than likely purchase their drawing boards, we will leave this matter for the reader to study at his leisure.

Thumb tacks are used to fasten the paper to the board. There are all kinds on the market, but a grade about 10c to 20c a dozen, will suit the student's purpose admirably.

In regard to the pencils required. Lead pencils are graded according to their hardness, the degree of which is indicated by the letter H. For example H. means simply one degree of hardness, 6H, six degrees, and so on. A pencil of 4H grade is ideal for general working conditions. Some authorities claim 2H, or 3 H are better suited for lettering purposes, while for intricate detail work



SKETCH OF DRAWING BOARD



SHARPENING THE PENCIL

the objective of each student should be to land at least one prize. So now that we have introduced the object and aim of this series, let us proceed at the very beginning, and see what mechanical drawing really is.

of this course, we will consider only the paper most suitable for our purpose, for practically every drawing office throughout the country have their own particular pet paper, which they claim is the best ever.

a 6H pencil will be found best suited to this class of work.

The hard pencils should be sharpened as shown at Fig. 2, so that in penciling a drawing the lines may be made very fine and light. The wood is cut

away so that about $\frac{1}{4}$ in. to $\frac{3}{8}$ in. of lead projects. Lead can now be sharpened to a chisel edge as shown on the sketch. In the drawing of the lines the student should place the chisel edge against his T-square, or triangle, enabling him to draw a clean cut fine line, through points as desired. Should no inking be necessary, a softer grade of pencil is used, than if it is intended to ink in over the pencil work.

T-Square

The T-square gets its name from its

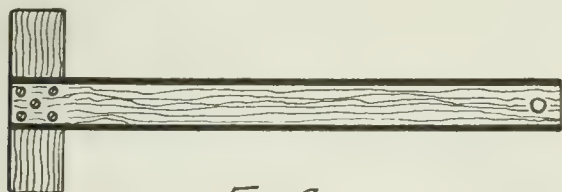


FIG. 3.

SKETCH OF T-SQUARE

general appearance, and consists of a thin straight edge called the blade, with a short piece called the head, and fastened at right angles to it, see Fig. 3. T-squares are usually made entirely of wood, pear and maple, in the cheaper grades; mahogany, with protection edges of ebony, in the middle class, while celluloid edges are placed on the more expensive ones. Readers need not go to much expense on this end, except they really wish to, for a T-square of good quality can be secured for very little cost. Some T-squares are also provided with swivel heads, but for the purpose of this series, we will not discuss this point, as it is not a necessity.

To show clearly the use of the T-square refer to Fig. 4. Always keep the head A up against the left hand edge of board, otherwise the various lines drawn will not be parallel. Lines A, B, C, D, and E, are drawn $\frac{1}{4}$ in. apart, and 6 in. in length.

Take a piece of paper, and practise

with your rule, and draw your vertical lines 6 in. apart with a triangle, which we will now describe, both as to its uses and material.

Usually triangles are made in two styles, 45 degrees and 60—30 degrees as shown at Fig. 5. A represents the 45 deg. triangle, while B illustrates the 60 deg.—30 deg. These instruments are made

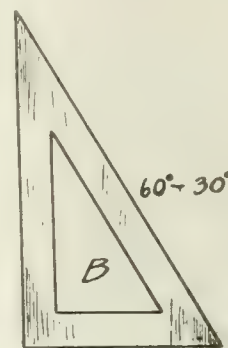
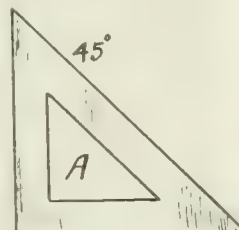


FIG. 5.

SKETCH OF TRIANGLE

of wood, steel, celluloid, or rubber, depending on the price. The student's pocket book capacity can be his guide, as to the kind he purchases.

A 6 in. or 8 in., a side size, will be found convenient for most work, and will be ideal for this course. By purchasing a triangle of each style as already described, the student is well equipped for such work as the course will present, at the start.

Taking it for granted that the student has now a drawing board, T-square, pencils, rubber, and triangles, we can go ahead with the exercise at Fig. 4.

First practise making the lines A and B 6 in. apart. Draw these vertically by means of the T-square and triangle, either one, as shown. Next use the T-square only, and draw your horizontal lines, meeting the vertical lines, yet not going over them. This is most important, for the exercise is simply one to teach control of the hand. All lines must touch, but not go over, yet be sure of

After you believe yourself proficient enough, study Plate No. 1. To the best of your ability follow the instructions closely, draw up the plate, and send us in your work.

To the three neatest plates received, we will award a prize, in the shape of a special 6 in. steel scale, with drill sizes, decimal equivalents, etc., stamped on its face, and in all future issues on this series, will carry out the same plan, forwarding a scale to the three best and neatest plates received on each part or plate.

Instructions

First tack a piece of paper 10 in. x 15 in. on the drawing board, using T-square to see that it is placed on fairly square. Now draw the trimming lines $9\frac{1}{2}$ x $13\frac{1}{2}$ in. Next draw border lines as shown at Plate No. 1, 9 in. x 13 in., and join. Divide the sheet up into 5 sections A, B, C, D, and E. In portion E print in the lettering as shown, and while we do not expect this lettering will be of splendid standard, still it will help you to get ready for the separate lesson to come later in the course. In section A, complete the horizontal lines, each $\frac{1}{4}$ in. apart as illustrated, stopping $\frac{1}{4}$ inch away from the border, and dividing lines. In section B, draw up the vertical lines, following out the dimensions given. At section C, draw 45 degree lines as shown, using your T-square and sloping edge of 45 deg. triangle. At section D draw up the 60 deg. and 30 deg. lines as illustrated, using your 60 deg.—30 deg. triangle, together with your T-square. In all cases study the plate carefully, and work to the dimensions shown.

Remember that neatness counts. For the drawing of this plate use a 3 or 4H pencil, and make your lines decided, and plain. Send us in your work as soon as you can. We will judge each plate two weeks after its issue, giving you lots of time to send your work along steadily, so get busy with a capital B, and watch for Part 2, which will further explain the various instruments, and their uses. When sending in your plate use the coupon, and fill the same in carefully. At the same time if you feel so inclined, write us your ideas on this course, and if it appeals to you. We are mighty anxious to make this course

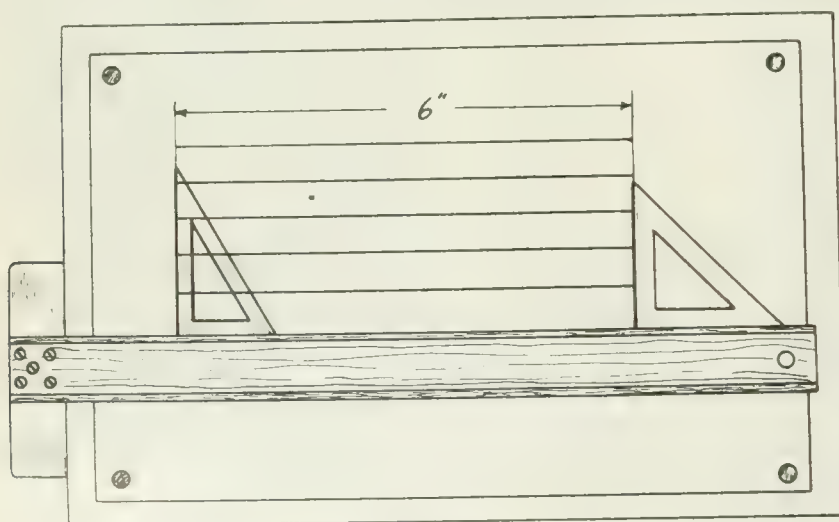


FIG. 4.

PRACTISE LESSON ON HAND CONTROL

this exercise. You will be surprised how the pencil will want to go still further, until you learn to control your hand properly. Mark your $\frac{1}{4}$ in. distances

the point, that they must touch. Draw these horizontal lines $\frac{1}{4}$ in. apart, mark-off the spaces with your ruler, or scale as it is usually called.

of great benefit, so let us hear from you when your work comes in.

In studying the plate, do not pay any attention to the scale, shown on the sketch. Work to the dimensions given, and the result will be what we want. We purposely do not give you an exact copy to work from, but rather let you prove that you have followed instructions closely. It is not necessary to ink in this first plate, so as stated before use a 3 or 4H pencil, and make your lines plain and decided.

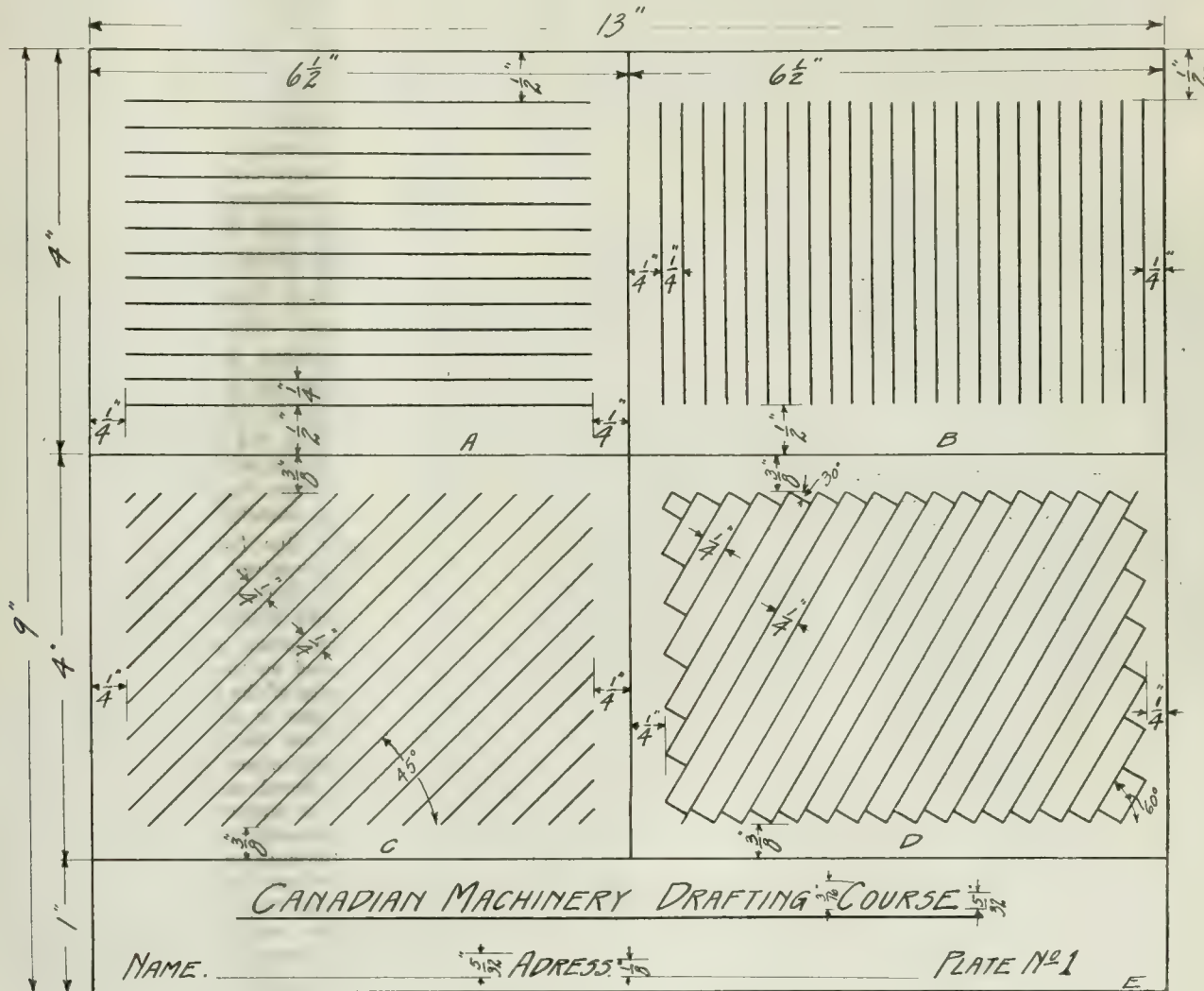
Mail your plate flat, do not fold, or if desired you can roll it up, and place it in a regular mailing tube. Be sure you have sufficient postage placed on the same. We will not return plates

unless specially requested to. In such cases return postage must always accompany the request. Address all correspondence on this course to CANADIAN MACHINERY Drafting Course, McLean Publishing Co., 143 University Ave., Toronto, Canada.

KEEP THINGS FREE FROM SOOT

All tubes, passages, and surfaces about the boiler should be kept free from soot, because this is an exceedingly poor conductor of heat, and if it is allowed to accumulate in quantity it will cut down the efficiency of the boiler to a serious extent by diminishing the absorption of heat. The various tubes, passages, and surfaces should be cleaned as often as

may be necessary in order to avoid such accumulation, and the man in charge of the plant can best tell, from experience, at what intervals this must be done. It is not at all uncommon for water-tube boilers, in particular, to be neglected until the soot in some of the passageways accumulates to an almost incredible extent. The existence of large quantities of soot indicates that the combustion in the boiler is not what it should be, and when there are heavy deposits of soot, attention should be given to the furnace, the draft, the method of handling the fires, and such other points as may suggest themselves, in order to see if the combustion cannot be improved.



HERE IS THE FIRST PLATE—SO GET BUSY

Tear off and send with drawing

COAL AT END OF RUN

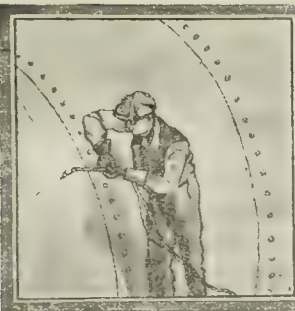
In ending any run of service of the boiler preparatory to laying it up for cleaning or repairs, the fire should be allowed to die out toward the end of the run,—just enough coal being fired, during the last hour, to keep up steam as long as it is needed. In this way it will be possible to avoid the waste involved in having a large mass of comparatively fresh coal on the grates at the time the boiler is put out of commission. While this point is a minor one, it is worthy of attention.

Name

Address

Position

Firm's name.....



WELDING AND CUTTING



Oxy-Acetylene Welding in the Railroad Shops

Interesting Facts Regarding the Use of the Oxy-Acetylene
Welding and Cutting Torch in the Railroad Shop—Paper Read
Before the Institution of Mechanical Engineers

By F. HAZLEDINE

IT is only about fourteen or fifteen years ago that the oxy-acetylene process of cutting and welding metal was in its infancy, or experimental stage. Its widespread and ever increasing popularity is no doubt due to the fact that the process offers general advantages over all other systems of blow-pipe welding, by reason of its extreme portability, wide scope, and the high efficiency of the autogenous weld produced.

Oxygen.—Oxygen is obtained for commercial use by the commonly adopted methods of, first, splitting water into its elements—oxygen and hydrogen, by passing an electric current through it, and secondly, liquefying air, and splitting it into its elements—oxygen and nitrogen. The oxygen so obtained is stored in large gasometers, and then compressed into steel cylinders at a pressure of 120 atmospheres. It is then in a fairly pure state; the British Oxygen Co. guaranteeing their product to be from 98.5 per cent. to 99.5 per cent. pure.

As a result of storing the oxygen in contact with water in the gasometers, a certain quantity of moisture is carried by the gas into the steel cylinders; the moisture condenses, and to expel it from the cylinder, which it is advisable to do in order to prevent the valve freezing in cold weather, it is only necessary to invert the cylinder, and allow the pressure of the gas to blow the water out as the valve is opened and closed two or three times.

Acetylene.—Acetylene is a gas composed of 92.3 per cent. carbon and 7.7 per cent. hydrogen. It contains the highest percentage of carbon of all the hydrocarbon series, and is produced by dissolving an equal volume of carbide of calcium and water. Carbide of calcium is made by fusing a mixture of lime and coke in the proportion of fifty-six parts by weight of lime to thirty-six parts by weight of coke in an electric furnace, the temperature of which is about 7,000 deg. F.

Several types of acetylene gas generators are in general use, and they may be classified as follows:

(1) Apparatus in which a quantity of gas sufficient for several days' use is manufactured and drawn off as required.

(2) Automatic generators in which the quantity of gas produced depends upon the quantity of gas consumed.

These are mostly of the moving-bell type, but they vary to the extent that in some the water is added to the carbide, and in others the carbide is added to the water.

The following is an analysis of "generator gas: Acetylene, 98.05 per cent.; oxygen, 0.08 per cent.; sulphuretted hydrogen, 1.7 per cent.; ammonia, 0.1 per cent.; phosphoretted hydrogen, 0.04 per cent.; silicon hydrate, 0.03 per cent.

Since the presence of sulphur and phosphorus in more than very small quantities is injurious to iron and steel, it is necessary to remove these impurities from the acetylene if reliable welds are to be made. This is done by a combination of mechanical filters and chemical actions, with a material which consists of iron-oxy-chlorides, the effect being the oxidation of the impurities. In cases where portability is of first importance, use is made of dissolved acetylene, which is supplied compressed to ten atmospheres in steel cylinders that are first filled with a porous material saturated with acetone—a liquid which readily dissolves acetylene. This gas, the use of which is known as the high-pressure system, is safe, clean, and pure; a point which has direct bearing on the quality of the weld produced.

The oxy-acetylene flame (the hottest flame known to science) consists of equal volumes of oxygen gas and acetylene gas, previously mixed in a chamber of the blow-pipe before issuing from the nozzle, where it combines with one and a half volumes of oxygen obtained from the atmosphere to complete combustion. The flame takes the formation of two cones—an inner cone of intense heat (about 6,300 deg. F. at the tip),

composed of about equal parts of hydrogen, carbon, and oxygen, enveloped in a relatively cool flame of hydrogen and carbon-dioxide. However, much depends upon the regulation of the flame, as an excess of oxygen will cause the metal to be oxidized, and an excess of acetylene will cause the metal to be carbonized. The welder is guided by the appearance of the flame; that is, the relative size and shape of the two cones, and by the nature of the sparks thrown off from the metal, white star-shaped sparks indicating excess of oxygen. The blow-pipes in use are of two general types, namely:

(1) One for use with high-pressure gas (dissolved acetylene).

(2) One for use with low-pressure systems (that is, generator gas).

The latter type of blow-pipe is constructed on the "injector" principle, the velocity of the oxygen causing the acetylene gas to be drawn from the generator into the blow-pipe, where it is intimately mixed with the oxygen. It has been found necessary to insert, in all cases, a hydraulic safety-valve between the generator and the blow-pipe in order to eliminate any chance of the gas back-firing into the generator. The high-pressure blow-pipe is simpler in design. As the oxygen and acetylene are both under pressure, the "injector" construction is unnecessary, therefore the only arrangements required are: a suitable valve for the control of the oxygen gas, and a roll of wire-gauze to prevent back-firing of an explosive mixture. The best blow-pipes for general use are those which are supplied with different size tips ranging in capacity from 50 to 2,000 litres per hour. This obviates the necessity of having to purchase a number of complete blow-pipes, and is also the means of saving time when changing from one class of work to another, as it is easier to change a nipple than to disconnect and recouple the gas supply to a blow-pipe.

It is impossible to overestimate the importance of adequately preparing the

work before the weld is actually attempted, as any time spent in this way is amply repaid afterwards, in the easier execution made possible by it, and also by the homogeneous nature of the weld. It is a matter, however, in which it is impossible to lay down any hard and fast rules; the varying nature of the work accomplished making it impossible to do so. The general principles obtained in the best practice point out that the line of the weld must be opened out, that is, the two sides bevelled to form an angle of 90 deg. The reasons for this are:

1. To make certain that the weld will be penetrated, not merely sealed over; and
2. To strengthen the weld by increasing the surface in contact.

It is essential that the line of the weld should be thoroughly cleaned either by hand tools or some chemical agent. The most important part of the preparation is that of arranging the pieces to be welded in such a position that there will be no deformation, breaks, cracks, or integral strains, and that they will be linable at the conclusion of the operation. This is the point in which the experience and skill of the operator is revealed as there are no rules to guide him; and upon any work but that of the very simplest character, failure to grasp and apply the laws of expansion and contraction means the partial or total ruin of the work. It is impossible to control expansion and contraction by physical force, so that the only way to prevent disastrous results is to foresee the probable direction and extent of the phenomena, and nullify the effect by preheating certain parts of the work, either by the blow-pipe, or by the welder's furnace. It is good practice when the article is not too cumbersome, to raise the temperature of the whole piece of work nearly to red heat in the furnace, make the weld whilst the temperature is still rising, and then allow it to cool slowly and uniformly in sand or asbestos, or by allowing the furnace to cool off, but in this case care should be taken to shield it from all currents of air. In large pieces of work, pans of charcoal and coke are placed in the immediate neighborhood of the place which it is desired to heat. In the case of castings it is advisable to preheat them bodily, not locally, as there is always the chance of discovering the presence of an internal strain due to the irregular cooling of the metal when it was cast. It is advantageous to preheat work in all cases in order to save oxygen and acetylene for although the heat of the oxy-acetylene flame is intense, the total amount of heat contained is not very great, and much would be lost by conduction to colder parts of the work.

The actual execution of the weld, after it has been properly prepared, is a fairly simple matter to an experienced operator, providing the welding-rod and flux of the correct composition are at hand. For wrought-iron and mild steel, the welding-rod used to replace the metal removed in forming the V should be of soft pure iron, known as Swedish iron.

For cast-iron, the welding-rod should be made of the best grey cast-iron, containing about 5 per cent. of silicon, and be free from manganese, as the silicon destroys the oxide of iron formed, and results in a weld of grey iron which is not too hard to work with ordinary cutting tools; but manganese would tend to combine the carbon and iron, and make a white iron weld which would be unworkable. It is also necessary to use a flux to slag the oxide. A well-known and excellent flux in powder form is made of equal quantities of carbonate and bi-carbonate of soda, to which is added from 10 to 15 per cent. of borax and 5 per cent. of precipitated silica. The flux is applied by heating the end of the welding-rod and dipping into the flux.

For copper, the welding-rod used should be of phosphor-copper with just a trace of aluminum. It is found that the introduction of a small amount of phosphorus prevents the absorption of hydrogen and carbon-monoxide, which would escape as the weld was cooling and form blow-holes and also prevent oxidation. The flux used is in the form of a powder consisting of sodium borate, chloride of sodium, and boracic acid, although it is not absolutely necessary if the edges of the weld and the metal to be added are clean.

SAVING LIFE BY OXY-ACETYLENE

An extraordinary story of the salvage of a British submarine which went down near the Clyde was recently cabled by the Associated Press. The submarine had seventy-three persons on board including naval contractors and men from the yard where she had been built. The order was given to submerge, and she was just beneath the surface when water began to pour into her aft and she descended stern down to a depth of fifteen fathoms.

A few hours passed before divers were sent down on what they thought was a forlorn hope so far as bringing anyone up alive was concerned. Reaching the bottom they discovered that the stern of the vessel was embedded in many feet of mud. Knocking at the hull they were amazed to hear a responsive tapping.

Strong wires were put round the vessel and the air cylinders were utilized to blow out the oil fuel stored forward, which enabled the vessel to drive upward until her bow was well above water in a perpendicular position. Immediately a big hole was cut in her with oxy-acetylene cutting blow-pipes and forty-two men were brought out. They had been below fifty-seven hours before being saved.—From the "Acetylene and Welding Journal."

WELDING FOREMEN

One of the real troubles in the welding industry is to find foremen who appreciate the problems involved; that is, men who can be made to feel that welding is more than a mechanical job. All kinds of men have been selected for this position, and for all kinds of reasons. One superintendent may prefer a blacksmith

because a blacksmith is familiar with steel and iron, but he ignores the fact that the blacksmith knows nothing about cast iron, brass, aluminum, etc. Each trade finds its special knowledge useful in welding, and a first-class welder should know something about all metal trades. A welder who does only one thing can be trained quite easily in a short time, and he need not know much more than how to do his special work correctly, but the man in charge must know more than this. A person ignorant of the elementary practices of metallurgy and mechanics cannot be safely entrusted with welding work that involves possible damage to person and property. When those in authority fully realize their responsibility in this matter, proper methods of instruction such as welding schools and trade journals will come into their own.—From the "Acetylene and Welding Journal."

SAFETY VALVES AND BOILER HEATING SURFACE

The now accepted rule that the size of the safety valves of the ordinary type required on each boiler shall be determined as follows:

Area of safety valve in square inches equals total heating surface of boilers in sq. ft.) multiplied by 1.25

$$p + 15$$

where p is the working pressure in pounds per square inch. A set of experiments made by Isherwood showed that increase of efficiency was associated with a reduction in the tube surface, so it is pertinent to ask how the safety valves referred to would answer in this case. In the first series, the boiler heating surface was 792 square feet, and the pressure 80 lbs. gauge, so that the area of safety valves

$$= \frac{792 \times 1.25}{80 + 15} = 10.42 \text{ sq. in. or } 3.64$$

in. diameter. In the second case with half the tube surface then this formula would give the safety valve area

$$= \frac{424 \times (1.25)}{80 + 15} = 5.580; \text{ or } 2.66 \text{ in.}$$

diameter.

A rule which gives results of this character is one that can hardly be deemed entirely satisfactory, and points to the desirability of returning to the notion that the maximum rate of evaporation depends upon the maximum capacity of the furnace to liberate heat energy. The area of the fire grate is surely the measure of the safety valve area.—M.M.

Can Export Now.—The Canada Trade Commission announces a new ruling under which it will be possible to resume exportation of wood pulp to Mexico. Owing to conditions arising out of the war both Canada and the United States were obliged to exercise extreme caution as to permitting the exportation of any paper-making material.



WHAT OUR READERS THINK AND DO



Views and Opinions Regarding Industrial Developments, Factory Administration and Allied Topics Relating to Engineering Activity

INTERESTING MILLING FIXTURE.

By J. H. MOORE.

There are many methods employed of hobbing screws, but one of perhaps the most interesting fixtures for milling screws, used for jacks, came to the writer's attention the other day. The photo illustrates its construction clearly, and

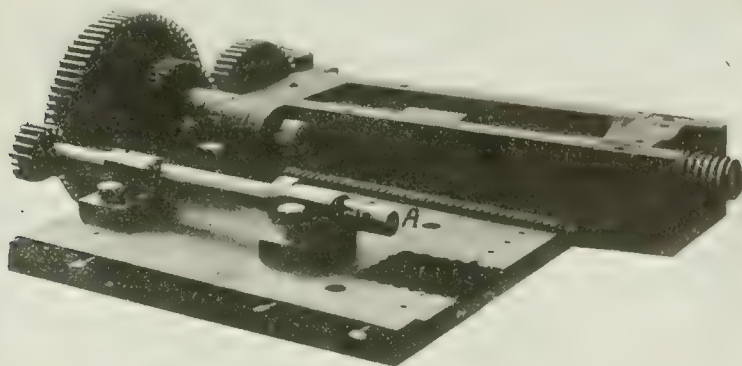
joint shaft on feed gear box. By this method a direct gear drive from the gear box is obtained. The operation time on this work has been cut down more than half, and a much better class of work has been obtained, than by the former method. A hobbing cutter is, of course, placed on the miller arbor when the work, by means of the gearing, feeds

forward, makes a cut and returns to its original starting point and then indexes. This makes it necessary to drag the tool back over the work, and as there is always some spring to the tool when cutting, as a general thing, when the tool is going back without cutting it will scratch the work, sometimes very deeply.

To eliminate this scratch on the finishing operation on particular work, a tool similar to that shown in Fig. 1 was designed. This is held in a holder A to the turret. In this holder is mounted a sleeve B. This sleeve is revolvable in the holder so as to give the proper clearance and cutting rake for the tool, and when located in the proper position is rigidly clamped by the two bolts C, with nuts and washers on same.

A lengthwise adjustment is also provided on this sleeve by means of adjustable nuts D and E. At the end of this sleeve B two lugs F and G are arranged. The purpose of these lugs will be described later. The cutting tool itself, H, is held in a shank J by means of screws K. This shank is free to revolve in the sleeve B, two hardened steel bushings, L and M, providing bearings for the same, while the adjustable nuts N keep it back in place against the shoulder O.

When turning work the thrust of the cut is taken in the direction of the arrow, which pivoting about the centre P causes the face K on the shank to come against the lug F on the sleeve, thus making a rigid and fixed place for taking the thrust of the cut. When through cutting the work the spring Q contained in this lug forces the tool holder around until the other side of the lug on the shank of the tool comes against the screw R, thus the cutting edge of the tool is held clear of the work while the tool returns to its



GENERAL VIEW OF THE FIXTURE

the simplicity of the idea is its chief asset.

The mechanism is mounted on a flat plate, and consists of gears so arranged that, from the time they are driven from shaft A, until they reach the master screw B, the proportion is correct. This screw has a similar pitch to the one desired to hob or cut, and has a hole in its end into which the work is placed.

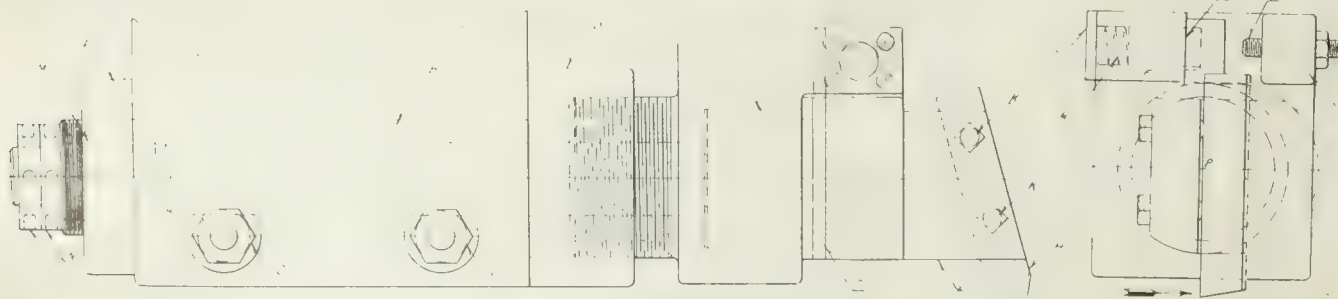
The complete fixture is mounted on the miller table, and end of shaft is connected by a special length bar to universal

crosswise at the proper speed, cutting a good thread of correct pitch. No doubt this scheme will bring to many readers' minds its possibility of adoption to other classes of work.

RELIEVING TURNING TOOL.

By F. SCRIBER.

When turning some classes of work it is very desirable that there be no marks on the parts being turned. A turret lathe usually comes

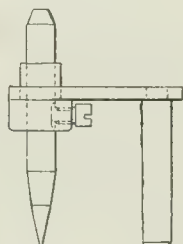
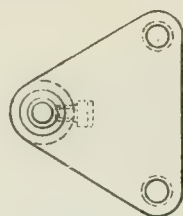


DETAIL OF RELIEVING TURNING TOOL.

original starting point. This simple operation of throwing the tool forward prevents scratches or tool marks appearing lengthwise of the work.

The spring is kept in place by the plate S, which is in turn held onto the sleeve of the tool by four small screws. When starting in on a new piece the action of cutting the material forces the cutter around the centre P, compressing the spring and bringing the shank of the tool up against the lug K, thereby returning the cutter to the correct position for turning.

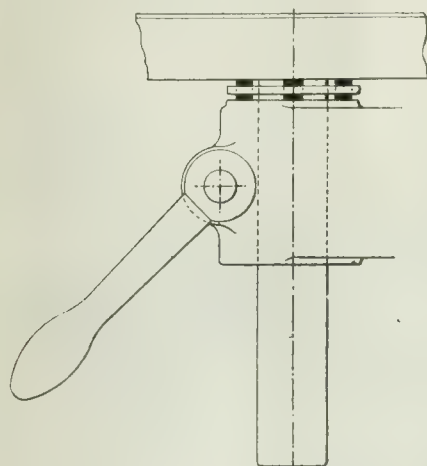
Atherley, Ont.—Tenders are asked for a 20 h.p. engine to run the stone crusher for Rama Township. The township will supply wood and water. Work will commence in May. Tenders must be in the hands of the clerk or reeve by noon on Saturday, April 12, 1919. Henry Heavener, reeve, R.R. No. 2, Atherley. W. M. Shields, clerk, OConnell P.O.



CENTRE PUNCH FIXTURE

CENTRE-PUNCH FOR ACCURATE LOCATING

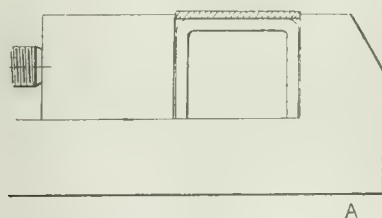
THE view offers a suggestion for a centre-punch, the idea being to provide means for holding it perfectly upright and steady, while the point is brought accurately to a line, or an intersection where it is desired to place a pop as near as possible true. A little stand is built of two pegs and a triangular plate, the latter having a bush forced into it, to hold the punch, which is secured by a set-screw. This tool also enables the tool-maker to get a better view of the surface, since it is only necessary to place a finger or two upon the plate or hold the pegs to keep the tool steady.—FRED HORNER.



SAFETY FLANGE PREVENTS BREAKAGES

SAFETY FLANGE FOR SENSITIVE DRILL TABLE

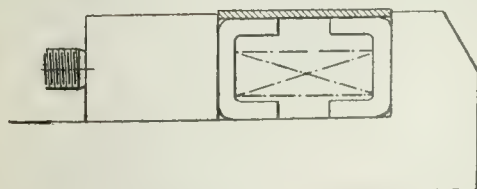
THE drawing shows a safety buffer flange that was fitted to the stem of a sensitive drilling machine table, the object being to prevent breakage through youngsters allowing the table to bang down violently through neglecting to hold it firmly when loosening the grip handle. The machine was in a small shop, for general service. The buffer consisted of a thin ring like a pipe flange templet, with four holes into which were pushed rubber plug. The hole in the ring was a loose fit on the table stem.—FRED HORNER.



A



B

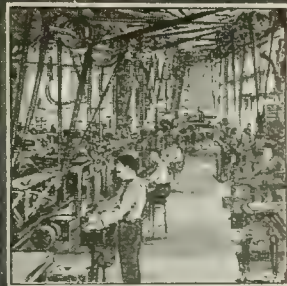


C

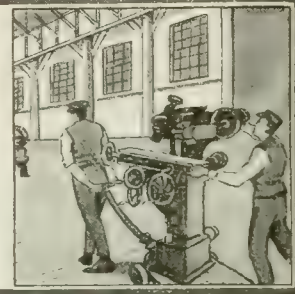
PACKINGS FOR THIN WORK IN TOOL-MAKERS' CLAMPS

VERY thin plates or pieces that have to be held in toolmakers' clamps for operating on by hand or machine must usually be packed up firmly to prevent them from slipping down under the pressure of the tools. Three kinds of packing are shown in the view, A being one for repetition pieces, simply plate bent round. At B strips are bent, one round each jaw, this being suitable for any width of opening of the jaws, but giving no support under the central areas of the work. A compromise between the two is seen at C; here pieces are bent into U shape, if necessary being wedged apart firmly with a wooden block or wedge, seen dotted.—FRED HORNER.

PACKING FOR THIN WORK IN TOOL-MAKERS' CLAMPS



DEVELOPMENTS IN SHOP EQUIPMENT



UNIVERSAL AND CHUCKING HOLLOW SPINDLE THREAD MILLER

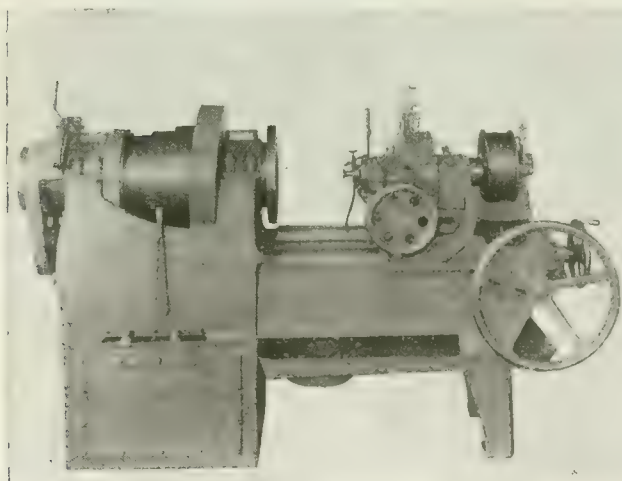
THE Smalley-General Co., Bay City, Mich., have developed a new universal and chucking hollow spindle thread miller similar to the No. 1 size, but of larger range and for work of smaller diameter than the former size.

General Description

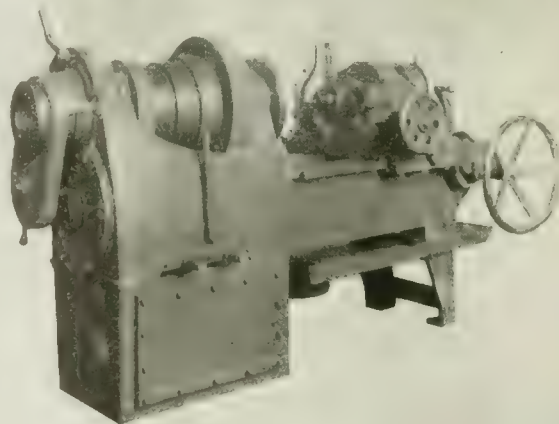
The salient features of the thread miller are sturdy construction, turning attachment, small floor space occupied, quick change of speeds and pitches for various threads, absence of loose gears,

the shift from neutral to milling speed or turning speed are obtained by shifting the levers on the front. The turning speed bears a constant relation to the milling feed so that it is fast for small work, and slow for large. This feature enables faces to be turned true with the thread giving perfect alignment when screwed together. The only loose gears are those required for the lead screw to change the pitch of thread milled. Thus it is seen that quick shifts from one job to another are possible. The chuck carrying the work is mounted on a flange on the outside of the main head spindle and

to which face plate or chuck of any type can be attached. The bearings are 8x6 inches and split. The main spindle is driven by means of a three step cone pulley and a gear train. Just beneath the main spindle is a combination of gears actuated through clutches which controls either the high or low speeds. The low speed is for milling, and the high is for lathe or turning speed. In order to govern the peripheral speed of the surface to be milled, there is located in the bottom section a system of sliding gears which in combination with the three step cone gives a total of 18 speeds. The lead screw is driven and



DIRECT FRONT VIEW



GENERAL VIEW

simplicity of operation and cleanliness. When the multiple tooth hob is used, the thread is completed at one revolution of the work, but when a single cutter is used as many revolutions are necessary as there are threads. If the threads are near the end of the work, the chucking type of machine as shown herein is recommended. For lead screws, jack screws, worms and work where the milled surface is 4 in. or more from the end, a centering type of milling head is supplied and the work is held between centres. The bed, which is of lathe type, has the main head cast solid with it, thus insuring rigidity and perfect alignment. Under the main head are the gears driving the main spindle. They are mounted on shafts in the cabinet leg, and so arranged that with the three step cone eighteen speeds can be obtained. The changes of speed and also

changes of pitch are obtained as in a lathe. The machine will swing 20 inches diameter. The maximum distance from the face of main spindle to the face of milling spindle with popular sized bed is 20 inches. Any length of bed can be provided. It will mill either internal or external, right or left hand, straight or tapered threads. It is not adapted to the milling of absolutely square threads.

This machine will swing 20 inches diameter. The maximum distance from the face of main spindle to the face of milling spindle with popular sized bed is 20 inches. Any length of bed can be provided. It will mill either internal or external, right or left hand, straight or tapered threads. It is not adapted to the milling of absolutely square threads.

The spindle in the main head is 38 inches in length with an opening through the centre 6 inches in diameter. It carries a flange 15 inches in diameter

changes of pitch are obtained as in a lathe.

Located on the ways of the machine is the bottom slide which in turn carries the top or cross slide. This cross slide is controlled in its relation to the bottom slide by means of a micrometer screw, by which the diameter of the thread is controlled. The top slide carries the milling spindle which is either direct driven for light threads, or back geared for the usual run of work. The spindle bearings are 2 3/4 inches in diameter by 6 inches in length. The milling hob is held on this spindle by means of a tapered arbor and a draw-in bolt. Just back of the spindle is placed a tool holder. In front of the spindle is a socket for boring bar. Either may be used in connection with high speed for finishing or facing, and it is usually unnecessary to remove the turning

tools when milling. When milling, the bottom carriage is clamped to a feed tube located between the ways of the machine. All the slides are provided with tapered gibs. The bearings of the bottom slide on the ways are 24 in. x 24 in., while the guiding or gibbing ways are 24 in. x 8 in.

The cutting lubricant falls into the steel pan below the shears, and then drains into a settling basin on the bottom of pan. From there it is taken by reversible oil pump with flexible metallic connections back to the work. The machine is fully equipped with grease cups and self closing oil cups. The milling spindle and back gears are lubricated by plural oiler located within easy access and sight of operator.

Slides are provided with wipers to keep them clear of chips.

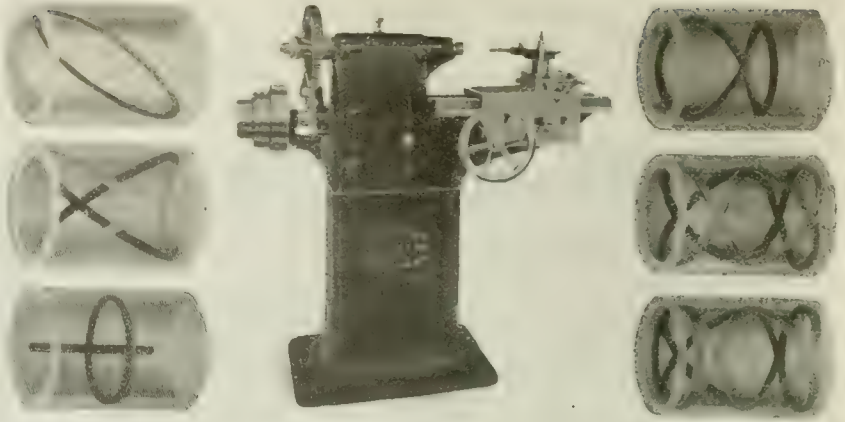
Most of the gears in gear box revolve on hollow shafts which are packed with an absorbent. These shafts are filled with oil, which slowly drains out through holes in the tube, thus oiling the bearing. The lower shaft turns, but is immersed in oil.

The unique feature of the Smalley General Thread Miller is the feed-tube and lead-screw device which controls the lead on the thread to be milled. Some of its important advantages in brief are:

(a) The dragging backward action against the thread of the lead-screw prevents any backlash.

(b) The 12 inches of thread on the lead screw, as against the 4 to 5 inches on ordinary machines, gives longer life, greater accuracy and larger production.

(c) The thread can be picked up at any time or place. It is not necessary



GENERAL VIEW OF MACHINE AND WORK

to wait for the split nut to come around as on a lathe.

(d) It does not use up the lead-screw when in high or turning speeds.

FISCHER OIL GROOVING MACHINE

The Fischer Machine Company of Philadelphia, Pa., have recently placed on the market what is known as their oil grooving machine. This machine, with some of the classes of work as accomplished by it, is shown in the accompanying photograph.

The machine has been designed to automatically cut oil grooves in bearings, and by means of certain gear changes, will cut straight grooves as well as

spirals, as shown in illustration. It will do both internal and external work.

Machine is convenient and easy to operate, has few parts, there being no complicated mechanism to cause trouble, all operating parts being thoroughly enclosed and dirt proof. The machine may be locked by means of a binder screw, and the clutch disengaged, in this way adapting machine for cutting keyways.

The tool slide has a reciprocating motion, and is linked to an adjustable connecting rod, and will cut any length groove within the capacity of the machine, which is 10 inches over the carriage, and a stroke from zero to 8 inches. This machine effects a great saving of labor, does better and more uniform work than can be done by hand. General specifications follow:

Net weight of machine, 815 lbs.

Net weight of countershaft, 130 lbs.

Gross weight, 1,000 lbs.

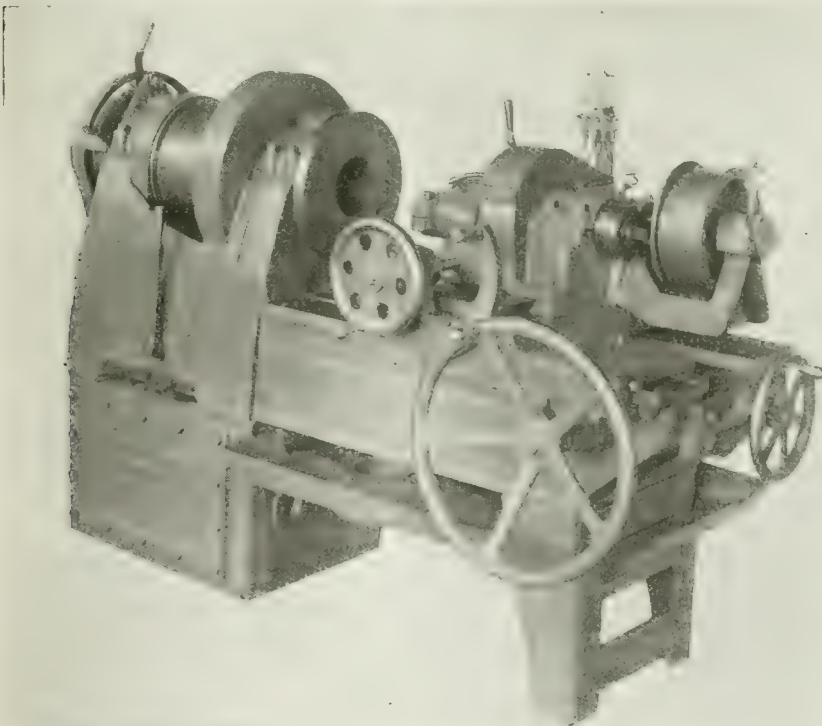
Size, boxed for export, 60' x 54' x 30'.

Gross weight, 1,000 lbs.
lbs.

NEW PUBLICATIONS

The Landis Machine Company, Waynesboro, Penn., have published a 50-page booklet on the Landis Pipe Threading Machinery. This publication, catalog No. 25, illustrates and describes in detail the Landis stationary pipe drive heads, pipe threading, cutting machines, rotary pipe and nipple threading heads, etc. The excellent illustrations combined with the text make the publication of considerable value to those interested in the pipe threading and cutting machinery.

The Independent Pneumatic Tool Company, Chicago, has recently sent out a new folder descriptive of the Thor Line of pneumatic tools. The various tools are displayed and described in such a manner that a ready comparison may be made of the various classes.



CLOSE UP VIEW OF MACHINE

The MacLean Publishing Company

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No. 14

A Changed Russia?

SELLING goods to Russia has been regarded as a risky proposition for a long time. There are many Canadian firms that were hard hit by having merchandise in Russia on the outbreak of the war and to them the idea of once more putting merchandise in that market was of secondary rating to the paramount question, "Who is going to pay for them?" Even Canadian firms which have had a very large connection in Russian and Siberia make certain now that any shipment they might be contemplating is well covered in advance.

Now comes word from New York that L. C. A. K. Martens, who has been a resident there for some time, is prepared to act on behalf of the Soviet Government with the idea of spending about \$200,000,000 in gold.

The purchases he requires to make include railroad supplies, agriculture implements, machinery, tools, mining machinery and supplies, electrical supplies, printing machinery, textile manufactures, shoes and clothing, fats and canned meats, rubber goods, typewriters and office supplies, automobiles and trucks, etc. Russia, on the other hand, is prepared to sell flax, hemp, hides, bristles, furs, lumber, grain, platinum, metals and minerals.

Mr. Martens further makes the assertion that German domination of trade and political conditions has been broken and that "Russia is starting all over again." The Russian agent also goes on to state that many of the reports that have appeared in print regarding the murder carried on by the Government has been grossly untrue. Martens hopes to get recognized at Washington, and open up trade between the two countries.

Stop Talking Prices

CANADIAN MACHINERY has received a letter, written to a well-known manufacturer, and some of the views on price and wage matters are well worth reading:—

An interesting fact has been brought to our attention. It relates to the manufacturing costs of steel products. The statement is to the effect that the Steel Corporation have paid in salaries and wages during 1918 considerably more than four hundred million dollars.

With their estimated production of finished steel the cost of wages and salaries alone, will, therefore, approximate \$25.00 per ton, from which it will be seen that before there can be a material reduction in the cost of steel products, it must be brought about through a reduction in wages and in transportation costs, for, as you know, transportation costs have advanced from 50 to 75 per cent. during the past several years, and you know that wages

and transportation enter very largely into the base cost of steel products.

This advance in wages and transportation will apply to ore, coal, coke, limestone and all other supplies.

As to the possibilities of wage reduction, one well-known New York man, in speaking on this subject the other day, expressed the belief that wages will not be materially reduced until 1920. He went on to say that undoubtedly Europe will be unable to harvest anything like a full crop in 1919, and that it will be 1920 before the food supply of the world is sufficient to reduce the cost of living.

He then urged that the business men stop talking about price reductions and saying that prices will shortly be reduced, for in doing so they destroy their own market and kill the business enthusiasm by keeping consumers out of the market.

In addition to the above, there is a constructive side, for in Europe there is an almost inconceivable shortage of iron and steel, representing an accumulated demand of more than four years' standing. This applies with equal force to South America, Australia, New Zealand, Japan, China, India, for the lack of transportation facilities have made it impossible to transport supplies to these countries.

We know that in the United States, a period of six months' depression in the steel business has inevitably been followed by a prolonged period of unusual demand, and we know that there has been a check on the peace consumption of steel in this country for approximately two years.

We have a strong conviction that this is a time when every business man should make a correct analysis of present world conditions and lend his assistance in a constructive solving of the present problems.

What That Drop Amounts To

HAVE you ever seen oil dripping? Didn't seem to be wasting much, did it?

But these drops amount to a lot if there are enough of them. Here is something worth remembering:—

Oil just dropping wastes: 15 gallons per day, 105 gallons per week, 5,460 gallons per year.

Oil wasting through an opening the size of the eye of an needle, one thirty-second inch in diameter, under 3 pounds pressure waste: 264 gallons per day, 1,848 gallons per week, 96,096 gallons per year.

Oil leaking through one-eighth of an inch aperture wastes: 2,788 gallons per day, 19,516 gallons per week, 1,014,832 gallons per year.

Steel Then and Now

SHIP plate has been reduced in Canada to 4.50 cents per pound. Market quotations from United States makers make this figure possible.

During the war the prevailing price was from 10 to 12 cents per pound. The firms selling in Canada were not making any more than they are now.

It is a significant fact that there have been no wage reductions to make possible the cuts that have been made in the selling price of steel. For all intents and purposes wages are just as high now as they were when plate was bringing the long price.

The situation, looked at in an ordinary way, would mean one of two things: (1) The steel mills were making big money during the period of the war, or (2) they must be losing a lot of money selling at present quotations. Steel mills are not in business for their health, so that inference No. 2 can be dismissed.

During the war the great cry was for plate. Ship-building could not proceed without the supply. The fact that there was such a call is no good reason why the price should have been allowed to go crazy. It is plain evidence that there was war time profiteering.

Making a Serious Mistake Here

By AN INSPECTOR

IN July, 1913, the Ontario Government put into force an act concerning the design, construction and inspection of steam boilers, which was a long step in advance of any previous regulation.

Being framed on the line of the British Columbia laws, it was also a step towards the much needed uniformity of laws in the different Provinces, the absence of which makes a boiler safe in one Province and dangerous in another.

A Good Act

As we have said this act was a good one, and met with the unqualified approval of boiler builders, insurance companies and boiler purchasers, all of whom stood to benefit by it. The boiler builder had only to show that his boiler was built under the Ontario Act, to establish the quality of the article he was selling, the purchaser had the same guarantee as to the article he was buying, and the insurance companies had a certain amount of guarantee as to the risk they were taking. It gave the operating engineers or firemen a sense of security against accident, by reason of the boiler and fittings being of standard designs, and subject to the approval of the Government inspectors.

Hopes of a Better Era

This action of the Government led those interested in steam engineering to hope that other much needed reforms would ensue, particularly the granting of graded certificates. However, the Government was content to rest on its laurels, probably feeling that having done one good work, they were entitled to a period of recuperation. This, in itself, might not have been so bad, but that recently they awoke from their long hibernation with a feeling that something should be done. What malign force prompted this feeling deponent knoweth not, but in their anxiety to take some action the Government has passed an order-in-council which goes a long way to wipe out all the benefits of the Act of 1913.

The Order-in-Council

This order-in-council follows an amendment to the Ontario Factories Act, making it compulsory that all boilers (except those in private dwellings, or used for farm or agricultural purposes) be either insured with a Boiler Insurance Company, registered in the Department of Insurance, or inspected once annually by an inspector, duly authorized in writing by the superintendent of the Trades and Labor Branch.

The order-in-council provides that **any engineer holding a 1919 license shall be considered duly authorized to make such inspection.** An inspection of a boiler by the engineer in charge of that boiler will not be accepted, but an inspection by any other engineer will be. That is, an engineer can inspect his next door neighbor's boiler, and vice versa.

What an idealistic condition is opened up by this order-in-council. No more bumptious and critical inspectors poking their noses into all kinds of hidden recesses, and making foolish suggestions entailing more work for the poor engineer. Instead of that, Bill Smith gets his good friend and fellow lodge member, Jack Jones, to come around and just give his boiler a look over.

"Now Jack," murmurs Bill, "I guess there's no need of knocking that back hand hole out. It's always an awkward job to get it tight again with a new gasket."

"Sure Bill, that'll be alright," says the obliging Jack.

"I didn't knock the manhole door in, Jack. You can see everything from the front hand hole with this torch

of mine. Anyhow, you know you don't need to be afraid of any boiler I have charge of."

"That's true, me boy," agrees Jack. "We will just open the smoke box door and look at the end of the tubes."

This being done, and Jack assuring himself that the end of the tubes are still there, the inspection is completed. After a little desultory conversation Jack goes off with a feeling of a job well done. Before leaving he has arranged for Bill to reciprocate his kind offices the following week.

In the course of a few days Bill's employer gets a report from Jack Jones informing him everything is in excellent shape, which cannot fail to give the boiler owner the utmost satisfaction.

How About This Case?

Take another instance of what might happen. Supposing a plant of, say, 300 H.P., containing 3 boilers of 100 H.P. each. The company does not carry insurance. There is a certain weakness about one of the boilers, which the engineer knows of and has informed his employer. He knows it may run indefinitely, or may give out at any moment. An insurance inspector would insist on a repair. The plant is busy and a shut-down is undesirable. There is a little plant close to with one boiler, and an engineer holding a 1919 license, who can probably write his own name. He is called over and asked to make the inspection. Everybody is satisfied. It may be said that employers or owners would not permit such things. I will give instances of my personal experience on these lines which will dispose of that argument, a little later on in this article.

What An Inspector Should Know

Before going any further it would be well to discuss the duties and qualifications of a competent boiler inspector.

In England, where boiler inspecting has been brought to a perfection not known on this continent, the insurance companies demand a high grade class of men for their boiler inspectors. These men have to be qualified as engine inspectors also, and are almost invariably recruited from the ranks of the sea-going engineers. They hold either an extra first class or first class Board of Trade certificate, which guarantees them to be men of special training and experience. Having obtained a man of this calibre, these companies subject their recruits to a rigid course of instruction extending over some months, before they are allowed to go out and inspect on their own responsibility.

Evidently from the care expended in selecting and training inspectors, the heads of these companies do not believe that any Tom, Dick or Harry is qualified to inspect boilers. The chief men on the staffs of these organizations are men of world-wide reputation, such as Michael Longridge, Stromeyer, Brian Donkin, etc.

What then should the qualifications be to make a successful inspector?

First of all he should be a mechanic. Not necessarily a boiler maker, in fact, very few boiler makers are qualified as inspectors. He should have a thorough knowledge of the principles of design and construction of all types of boilers, fire tube and water tube. He should know the principles of combustion and of heat. He should have had considerable experience in operating, and combine with these abilities the faculty of being able to make a good working sketch. He should be able to make a clear and intelligent report on what he finds.

In his actual inspecting work his knowledge of boilers should enable him to detect incipient flaws and weaknesses, and suggest remedies to prevent their spread. The ability to state his opinions in clear-cut language, and a large amount of tact, are also qualifications to be desired.

Some of the insurance companies in Canada attempted to obtain these kind of inspectors, and in some cases succeeded. However, what militates against them is the fact that these men can command much higher salaries than the insurance companies can afford to pay, from the incomes they receive. They do get the best men possible, and under the direction of their chief engineers they do good work.

One thing is certain. A company that stands to lose real money by an accident will, in the nature of things, be more particular in their inspection than any other agency.

Not a Sinecure

The work of a boiler inspector carried out conscientiously is arduous, dirty and uncomfortable. It is more so in Canada than need be, owing to the disinclination of the average engineer to properly prepare his boiler for inspection. The inspector is hampered in his work by having to dig his way through hot ashes and soot, which should be cleared out long before he comes. He frequently has to argue and persuade in order to have the handholes and manholes opened up. It is not to be understood that this is always the case, for there are many engineers who take a pride in having things ready for the inspector. There are too many who do not, either from ignorance or unwillingness to make the effort.

Too much of this attitude has been engendered in the past by inspectors themselves. In too many cases the inspector did not carry out his duties in a thoroughly conscientious manner, but when conditions were against him simply let it slide. This made the engineers imagine that there was no need to bother. The result was that when the careless and incompetent inspector was relegated to the limbo of forgotten things and a new man more aware of his duties came along, trouble ensued.

To make a proper inspection of a boiler it should be cooled off thoroughly. The interior of the boiler should be perfectly clean. The exterior surfaces should be the same, and every part of the boiler that is possible of access in any way should be properly prepared. The inspector should then make a thorough inspection of every part, and be able to make a report of conditions that will be almost an exact index of that boiler's fitness for its work.

The characteristics of a steam boiler, its liability to sudden accident, or gradual failure through corrosion, are the same whether the boiler is located in Chowbent, Lancashire or Kalamazoo, Mich. Therefore, one would be led to imagine that the same or nearly the same ability would be necessary to inspect them. Evidently this is not so.

The Province of Ontario takes the view that any man who can throw coal into a boiler is qualified to inspect it. It takes this view in issuing its certificates by granting the same certificate to a man in charge of 5,000 H.P., as to the man in charge of 50 H.P. It further gives the man who has charge of one boiler and engine, and knows but little about either, the power to inspect a 500 or 1,000 H.P. water tube boiler and pronounce on its condition. Ye gods, was ever such a nonsensical and dangerous principle propagated by any responsible body?

There are good men in charge of stationary plants in Ontario as elsewhere, but the majority are no more fit to carry out an inspection of a steam boiler than they are to diagnose a case of sickness and prescribe for it. This is not meant as disparaging their abilities for the position they hold, but rather to point out that their training and education has not been along lines such as would fit them for the task. Many engineers (?) holding Ontario licenses are practically illiterate, and a special clause is inserted in the examination regulations

to allow these men to have a person to write down their verbal answer to the examination question or allow the examiner to perform this duty. Yet these men are qualified by an order-in-council to assume the responsibility of declaring on the safety of a steam boiler. The extent of their experience consists in a large number of cases in having fired a boiler for some years, coupled with starting and stopping a steam engine and making minor repairs, such as packing glands, etc.

As to the argument that boiler owners would see for their own sake the necessity of having as thorough an inspection as possible. Some boiler owners will, but many more will, from a false sense of economy, avoid it as far as possible.

The writer was asked to make an inspection of a boiler which had been giving trouble by leaking round the seams. The owner said he had a good engineer, but would like an outside opinion. On being asked if the boiler had been inspected regularly, he said not for some years; he didn't think it needed it. A visit was made to the boiler room while the boiler was under steam to get a general idea of conditions. There was some leakage over the fire seam and round the front head. The gauge glass showed signs of being plugged up, and looking in the fire door to observe the girth seam, the back end of the combustion chamber was observed to be pretty near filled up. Arrangements were made to let the boiler down and to make an internal inspection the next day. It took an hour's hard work the following day to get the back handhole door knocked in, the scale was piled up so thick and hard against it. The dirt and ashes had so much accumulated in the combustion chamber and up to the bridge wall that it was almost impossible to get any kind of a fire in the furnace, and that fact alone had saved the back plate from bulging. The small amount of heat that could be obtained kept the water circulating over the fire, and the solid matter was deposited on the back plate. After the inspection had been completed, the owner was asked how the boiler had got into that state and how often was any cleaning done. He stated that he had stopped the cleaning, as his man used to spend four or five hours every Sunday on the job, and it cost too much.

Another case was where a locomotive boiler had been installed by the owner and his engineer. This boiler had been set up in such a manner that the fire was under the fire box altogether, and the solid mud ring was exposed to the full heat of the flame. The result was, as might be expected, innumerable cracks and a fractured ring. This owner prided himself on knowing all about boilers.

The writer remembers well a case of a hospital in a large city in Ontario where dangerous conditions prevailed, and it was only after several strong reports had been made, and pressure put upon the authorities that these conditions were remedied. And the boilers were in the basement of the hospital.

In large plants or medium-sized plants owned by responsible manufacturing concerns, every care is taken to safeguard the boiler and maintain its efficiency, and every recommendation of an inspector is carried out. These clients will not be affected by the new order.

It is the hundreds of small, one-boiler concerns which stand most in need of efficient inspection that will be the ones to take advantage of this new order of things. The owner who hates to spend a cent on his boiler upkeep will be the one to pick out a man he knows will be easy to make the inspection. Was it for this class of owner the order was made? What is the object of it; through whose influence was it promulgated? What are the arguments in its favor? And what do the engineers themselves think of it?

Probably some of them will be of the opinion of a certain Government inspector now deceased, but well known in his day. To all arguments of a technical nature he had one reply, "A kettle is a kettle, and a boiler is a boiler." In all the years this man inspected he was never known to go inside a boiler, and there are others.



MARKET DEVELOPMENTS



Consumers Get Benefit of All Reductions

Dealers Have Passed Along the Latest Cuts—Planes Are Showing a Tendency to Come to Lower Levels—Big Deal Put Through For Disposal of Shell Steel

NOT much time has been lost in passing the reductions made in the price of steel and iron on to the Canadian consumers. The price lists issued this week pass on the average cut of seven dollars per ton. Plate is now quoted at 4.50c per pound. In this connection it is worth noticing that there has been no wage reduction yet in the steel trade, and yet during the war plate sold locally at from 10 to 12 cents per pound, against the lowly 4.50 now. The inference is that either much money was made by the mills during the war or they must be losing quite a tidy sum now, and it is hardly likely that the latter will be generally accepted. It is perhaps a little too early yet to state whether the new prices are going to result in much vigorous buying, although the trade generally is very hopeful that such will be the case. There is already talk of further reductions, but it will be some months before anything in this line can be done.

Some machine tools are showing a tendency to drop

in price, but not to any very great degree. Planers are a little down, and they can afford to be. At the outbreak of the war and the beginning of munition making there was no demand for planers, and firms stopped making them. When war shops came into the market and when the shipbuilding programme was started there was a big call for planers, one U.S. Government order calling for as many as 400 at a time. The result was that prices simply ran wild, and they are still over twice the old price.

Some 40,000 tons of shell steel, the property of the I.M.B., was sold to Toronto scrap dealers during the week, and it is likely that the remainder of this material in the country will be shipped to England. No disposition has yet been made of the steel here that belongs to the United States Ordnance Department, although negotiations pending ought to bring something definite.

LOWER PRICES FAIL TO BRING MONTREAL BUYERS OUT STRONG

Special to CANADIAN MACHINERY

MONTREAL, April 3.—Reconstruction is still in the making, apparently, and business operations, on a sound basis, are delayed or postponed to a large extent by the unsettled conditions contingent on the readjustment that has been taking place since the first of the year. The extended delay that has taken place in the settlement of American shell contracts has prevented a speedy clearing of these plants, and the taking up of new enterprise. Considerable capital is tied up in this way, thus delaying expansion in other directions.

Price adjustments in steel are lowering the mill and warehouse quotations, but buying is still of a light character. Metals are devoid of interest. Machinery trade is quiet and old material has shown slight improvement.

Lower Prices, But Light Demand

Whether the decision of the American mills to meet the reduction in steel prices, announced by the Commission, and the apparent willingness of the Canadian mills to meet the changed conditions will stimulate buying is yet to be

seen. As yet, the movement has not been pronounced, but from past inquiries it would not be surprising to see a revival of heavy buying, not of an abnormal character, but of sufficient volume to create renewed confidence to the trade. One of the difficulties at the present time is in the operation of the mills, it being necessary in some instances to run for intervals, periodically, in order to meet trade requirements. Steel production on an economic basis requires continuous operation, so that light, but steady, demand necessitates the shut down of the furnaces during operating periods. Should lower prices create a better domestic demand it may enable the mills to operate closer to capacity and avoid expensive shut downs. Considerable war material is still stocked and producers are expecting to dispose of this at a loss. Local dealers have revised prices on some commodities to meet the lower quotations at the mills, but inquiry as yet has not been sufficient to indicate that heavy buying will immediately follow the cutting of the price. The base price on both iron and steel is now fixed at \$3.75

per hundred, and price revisions are expected on other lines. Dealers here have made a further adjustment in respect to plates, the new scale being \$4.50 on 1/4 inch, and \$4.90 on the smaller sizes. Black sheets have also been revised, No. 28 gauge being quoted at \$6.55 and No. 10 at \$5.15 per hundred.

Copper Undertone Better

The week's developments in the metal situation has added little interest to the market and the trade is still hovering on the brink of expectancy. In commenting on the better tone of the American copper situation, dealers here say that the optimistic tone is naturally reflected in local circles, but do not anticipate any immediate activity in this connection. It is reasonable to expect a revival of interest now and then, but a general return to normal activity will only take place when readjustment has reached the point where reconstruction can be carried on on a stable and reliable basis. Demand at present is of a light character, but the volume is relatively light. Price quotations are unchanged and firm at 19 and 20 cents per lb. The tin situation is still devoid of mentionable interest, the demand continuing to be largely for small lots. Operations are more or less obscured, and dealers report little future buying. All the

metals are inactive with price quotations unchanged.

Used Tools Still Prominent

Machine tool activity throughout the district continues to be of a transient character, the supply equal, at all times, to the present demand. Dealers are making occasional sales of new tools, but the bulk of the trading is in the transfer of used equipment from a previous buyer to new purchaser. In many instances these sales are made on a direct basis, but in others the dealers are acting the part of rebuilders, in overhauling and refitting the machines for more general purposes than for which they were originally designed or previously used. The question of price continues to be an influencing factor in the sale of new equipment, and it is this phase of the situation that places second-hand trading in the primary position. However, used machinery of a serviceable character is becoming scarcer, and eventually the demand will revert to new tools. With Government action in respect to lower prices on primary commodities the way may be opened for better quotations on finished products and machinery.

Scrap Improvement Anticipated

The outlook in old material and scrap circles has taken on a more encouraging tone during the past week, and while sales have increased but little, there is a feeling throughout the trade that a gradual revival will shortly develop. This is generally surmised from the belief that the lowering of steel prices will stimulate heavier buying, with the consequent increased demand for scrap. Dealers are less reluctant to take on additional material at prevailing prices, as many think that the trade is on the turn and that the market will become more active before the month is out. It would appear that shell earnings are pretty well absorbed, but heavy melting steel is still plentiful. Dealers buying prices here are well maintained, with the exception of two items, boiler plate and machine shop turnings, these having fallen off \$2 and \$1 per ton, the respective quotations being \$10 and \$5 per ton.

POINTS IN WEEK'S MARKETING NOTES

Production at U. S. steel mills is about 75 per cent. of capacity, which is equal to 105 per cent. of the 1914 capacity.

Further declines are looked for in steel, but for the present it is regarded as certain that prices will stand, and buying is proceeding on that assumption.

U. S. Railroad Administration ordered 100,000 cars, but the railroad officials refuse to take deliveries, and only 20,000 of the lot have been accepted.

Experts who have gone through the U. S. Steel Corporation report for the year claim that figures there show that consumers are paying too much for steel.

Some machine tools are showing a tendency to move toward a lower market price. In other cases deliveries are very indefinite and prices strong.

Some 40,000 tons of shell steel have been sold to Toronto scrap dealers, and great quantities of what remains will be sent back to England.

Plate is sold in Toronto and Montreal now at \$4.50 base.

New lists are out on lapwelded boiler tube, the discounts being raised from 37 to 40½.

The slowness of making adjustments with war contractors is causing some inconvenience in shops where the amount involved is needed as working capital.

whereby some 40,000 tons had been sold to a Canadian firm of metal merchants. A large melter has been in touch with the lot, but it has not been disposed of yet. No prices have been let out on the sale of this material, but it is understood that something in the neighborhood of \$11 was secured.

Although the tendency has not found expression in higher figures yet the market for red and yellow metals—copper, machine composition, red and yellow brass—is stronger. The copper market is showing more strength than at any time since the decline took place. The best evidence of this is the refusal of dealers to promise fourth-quarter deliveries. Otherwise the market is not improved. Dealers are not anxious to have offerings coming into the market, as it means stocking the stuff, and they are not at all anxious to do this.

More Cuts are Made

The cuts that were made in American steel prices were effective on March 21, the day of their announcement, and they have been passed on to Canadian dealers. It is correct to state now that Canadian purchasers can secure the advantage of all these reductions, as there has been a cut of an average of \$7 per ton on all warehouse lines. Some of the Canadian firms will be pinched a little by reason of having higher priced material on hand, but for the most part the Canadian warehouse interests will get out very well. They were not heavily stocked for the very good reason that they could not secure the material. The chances are that many of them would have taken on much larger tonnage had they been able to secure deliveries. Although they used to make wry faces at such things as licenses, preferences, etc., the chances are that in some cases at least the dealers will now be inclined to rise up and call these trade impediments blessings in disguise.

Plates and sheets have been brought down, the mark aimed at being a \$7 per ton reduction. The new price on plate is \$4.50 per pound (¾-inch up) and \$4.90 for 3/16.

Business is improving, and there seems to be no good reason why it should not continue to do so. There has been a tendency to hold back, or else to make purchases in very small amounts.

Boiler tubes did not stay very long with their pronounced intention of remaining at old figures. The cut on these amounts to the same as \$7 per ton on other lines, although it is worked out differently. The discount has been increased 3½ points from 37 to 40½. This concession is made only on lapweld steel tubes, but this covers the great part of the trade, as fully 90 per cent. of the tubes used in this district are of this sort. Seamless tubes are not yet cut. The mills making them have orders on hand that will run for some time, but the prospects are that sooner or later they will have to meet the reductions on the other varieties of tubes.

The Price of Machinery

If one imagines that all, or nearly all,

NO GENERAL REDUCTION LIKELY FOR PRICES OF MACHINE TOOLS YET

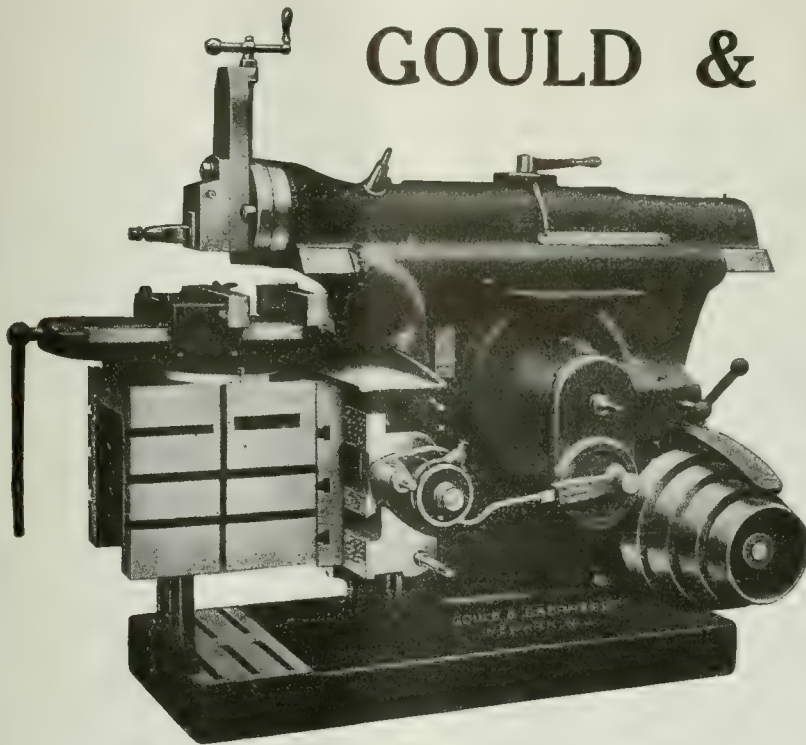
TORONTO. — Warehouses announce that all stock on hand has now been brought to the level of the recent cuts. It is anticipated that this will stimulate buying to a very considerable extent.

Machine-tool dealers notice a tendency to bring down prices from war levels. In fact this is quite marked in some cases, and equally absent in others, especially where makers have orders on the books and no stock on hand.

Some Movement in Scrap

Anything that looks like a deal helps to relieve the stagnation that has envelop-

ed the scrap market during the past three or four months. There are signs now of business coming to life, and also of a stronger feeling in some of the metal lines. There has been some little speculation regarding the disposal of much of the shell billets that are stored in this country, the property of the Imperial Munitions Board and of the U. S. Ordnance department. We understand that a great deal of the Imperial Munitions Board steel will be shipped out of the country, probably to England, although CANADIAN MACHINERY learned today that a deal had been put through



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the war-shop machinery has been absorbed, all that is necessary is to take a look through some of the shell shops that have been partially dismantled. Of course much of the stuff will bring only scrap bids, but there is enough outside of this to be a factor in the market.

It is hard to see where there is going to be much reduction in the price of machinery. Planers are showing symptoms of coming down, probably because the trip down is a long one, and they can afford to take it in large steps. Some of these machines are still a good 200 per cent. above old levels. At the first of the war no planers were called for, and as a result they were built in small numbers. When the rush of shipbuilding came there

was a big call for planers. In fact the U. S. Government at one time called for 400 at once. A tremendous demand and an empty market meant only one thing, viz.: greatly increased prices. Now that work calling for these machines is competitive and normal the prices begin to shrink. Some firms announce cuts of 15 and 20 per cent., but the best deliveries they can quote are two or three months ahead. Another well-known maker of gear hobbors promised between two and three months' delivery, whereas two or three weeks used to be the usual thing. One firm having three 60-inch boring mills in stock sold the lot in two weeks. There is a belief in Canadian trade that admits that the sale of new material is better.

and with war's end the position of these railroad officials is made stronger. Only about 20,000 of the 100,000 cars have been made and delivered.

With this question of costs and profits so prominent, the current report of the United States Steel Corporation is being studied with particular interest. The report states that deliveries during 1918 were at substantially "Government prices," from which there have since been reductions averaging about \$11 per net ton. Now while the corporation reported earnings in the year of \$208,000,000, or only say 25 per cent. more than in the best year before the war, the total profits were very much larger, there having been large deductions on account of special conditions that would not obtain in future. It is understood that bonuses to employees, on account of exceptionally large profits, amounted to something like \$10,000,000 more than would usually be expected. Then there was an adjustment of \$20,000,000 to inventory that will not have to be made again, while \$40,000,000 was charged off by reason of various facilities installed for filling war orders having become worthless. Finally there was about \$275,000,000 allowed for Federal taxes. The total profits therefore were in excess of \$550,000,000. While some producers assert that prices cannot be reduced unless wages are reduced, it is noted, by comparison with the total profits just mentioned, that the total wages and salaries paid by the Steel Corporation in 1918, exclusive of payments made by its four railroads now under control of the Railroad Administration, amounted to \$426,299,290. As the Federal tax is levied upon profits in excess of certain fairly liberal allowances, money that is earned to pay that tax can hardly be considered a necessary part of the expense of production.

It is not surprising, therefore, that many buyers expect additional price reductions. The common view is that such reductions are more likely to occur in June than at any other time. A quarterly readjustment of prices seems to be the natural thing, particularly as the War Industries Board set such a period.

Pig Iron

The foregoing applies particularly to steel. Pig iron may experience declines at almost any time, as the pig iron market, on account of the multiplicity of districts, each with its own individual market level before the period of Government control, is a much more complicated affair than the steel market, with its single Pittsburgh basis. The present effort is to hold all pig iron price cuts at \$7.25 per ton (\$3 reduction last December and \$4.25 in March) under the Government prices that ruled at the close of the war. That price schedule, however, presented some unusual features, the Eastern Pennsylvania furnaces being on a Pittsburgh basis, charging freight from Pittsburgh to destination rather than from furnace, while the Birmingham furnaces got as high prices at furnace as the Northern furnaces, when under competitive conditions they must sell at less, on

PRICES MAY BE CUT AGAIN, BUT FOR PRESENT THEY HELP BUSINESS

Special to CANADIAN MACHINERY

PITTSBURGH, Pa., Apr. 3.—The passing of another week has not brought iron and steel buyers to a more favorable appraisal of the price reductions that became effective March 21, nor do producers express more confidence that the reductions will bring about a general trade revival. There are a few who do, but the majority frankly admit that they expect some time to elapse, perhaps many months, to elapse before there is a really active market. This admission virtually carries with it an admission that prices will decline further before there is really heavy buying.

Fairly Active Market

All the business that was held back during the three or four weeks prior to the price reduction, and after Secretary Redfield had announced his intention of seeking deflation of war time prices, is likely now to come out, and in the past ten days it has been coming out in very good volume, making the market at least as active as it has been at any time since the signing of the armistice. It is observed, however, that the buying is from just the same sources as formerly, no new demand having been created, so that the volume on a long range average is not likely to be altered. Business is merely being placed now that would otherwise have been placed some time ago.

While the market can hardly be described as better than quiet, or moderately active, and while production is only at about 75 per cent. of capacity, sight must not be lost of the very important fact that such activity really represents an enormous tonnage of iron and steel. The viewpoint must be that of the large increase that has occurred in capacity. During ten years before the war the steel industry operated at its full capacity for only about three years out of every five, on an average, and the capacity was much smaller than that now existing. As there has been an increase of capacity during the war of 40 per cent., from 35,000,000 tons of annual ingot capacity in 1914 to fully 49,000,000 tons, a 75 per cent. operation now means a greater tonnage than

could have been produced before the war, as it would be 105 per cent. of the 1914 capacity. The capacity in that year, in turn, was much greater than the capacity in 1906, which will long be remembered as one of the very best years, if not the very best, the steel industry ever had before the war. It is surprising that the steel industry is not operating at capacity now. The wonderful thing is that such a large tonnage of steel is being taken by buyers and is consumed, for nothing is more certain than that no one is buying steel, or accepting delivery of steel, that is not urgently needed. Practically everyone believes that prices will decline rather than advance, and as they are not at all likely to decline in the very near future it is better to order at once if the material is needed soon.

Room for Declines

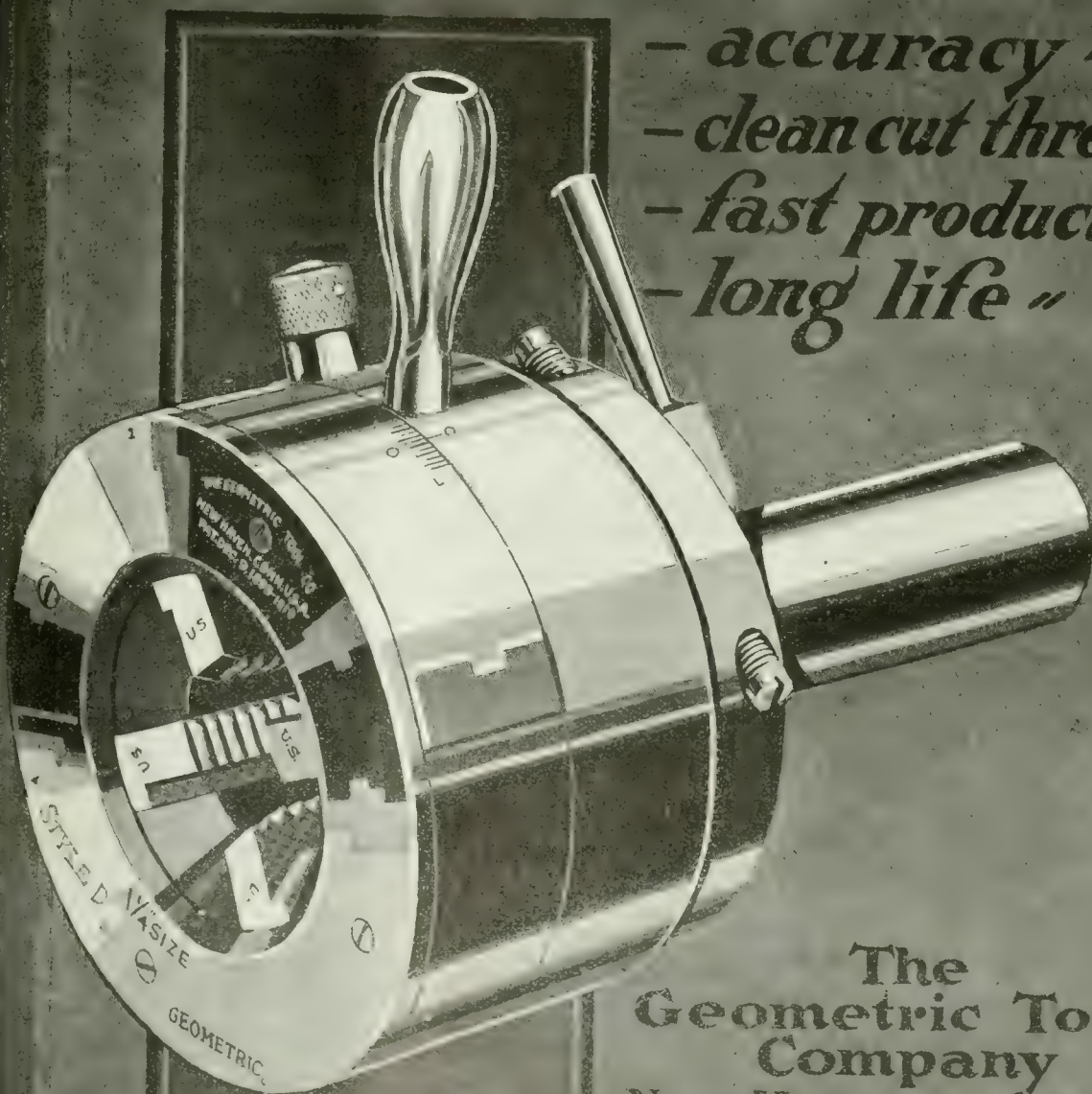
While iron and steel producers have much of their "costs" in their public utterances and in the arguments with the Industrial Board at Washington, the consumers are convinced that there is a large and unusual margin of profit from which price reductions could be made, and it is pointed out by some buyers and by a few particularly broad-minded producers that after all it does not do much good to convince people in Washington that costs are high and reductions cannot be made, because it is from their customers that the producers must secure their orders. It is the customer, not Washington, that must be convinced. It is true that the Railroad Administration is located in Washington, and railroad orders usually account for a considerable part of the steel business, but appearances now are that the Industrial Board does not control the Railroad Administration. It certainly is true that the railroad officials have a great deal to say in the matter of railroad purchases. The Railroad Administration cannot force purchases upon the railroads, as was proved by the case of the 100,000 freight cars ordered a year ago. Even before the war ended some of the railroads began refusing to accept deliveries of cars under that transaction,

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account of the heavy freights North.. As there is not enough demand to go round consumers will buy at the lowest delivered prices available, and that would shut some furnaces out of much of their trade. For instance, the basis price of No.2 foundry iron, silicon 1.75 to 2.25 per cent., is \$26.75. The valley furnaces will sell at that price, and so will the Buffalo furnaces, f.o.b. furnace in each case, but the Eastern Pennsylvania furnaces would quote that price, f.o.b. Pittsburgh. New England buyers would not take such iron, as Buffalo iron would be cheaper, yet in the past Eastern Pennsylvania furnaces depended on New England for considerable business.

At a meeting of the Associated Manufacturers of Merchant Pig Iron held in Pittsburgh late last week an assurance was secured from the Industrial Board that the board does not consider itself in any sense a Government price fixing body, hence the furnaces decided they had no occasion to adjust pig iron contracts to the reduced basis. Pickands, Brown & Company, Chicago, however, have issued formal notice that they will voluntarily make the concession to all customers on shipments beginning March 21.

IMPROVEMENT IN NEW YORK MARKET

Special to CANADIAN MACHINERY

NEW YORK, April 3.—The past week has produced a somewhat better volume of inquiry for machine tools than the preceding week. In fact, March business, on the whole, has been fairly good, comparing favorably with normal pre-war months. Some machine-tool builders are complaining, while others have a fairly good budget of orders. Certain types of tools are naturally in greater demand than others.

As has been noted in previous letters, the farm tractor industry has been making great strides since the end of the war, and manufacturers of tractors have come into the markets for quite a large number of machine tools. In this connection, the report of the Department of Agriculture that the 1919 output of tractors will be 315,000 is of interest, as this is more than double the number that were turned out last year.

A Big Field

J. N. Willys, president of the Willys-Overland Co., Toledo, Ohio, in making his annual report, says that the outlook for the farm tractor and automobile industries was never brighter. Mr. Willys says that the output of cars from his own plants will be 175,000, or more than twice the depleted 1918 production and exceeding by 25 per cent. the company's best year. Mr. Willys reports a steadily increasing demand for cars. As other automobile manufacturers are also expanding to a similar extent it is obvious that the automobile manufacturing industry will continue throughout the year as one of the best customers of the machine-tool builders.

Slow Move Here

One thing that is holding back buying of machine tools to some extent is the slowness of the United States Government in making settlements with war contractors. The British Government is also somewhat slow in this respect. However, the work is proceeding gradually, and with much of the preliminary details out of the way the actual cash remunerations should soon come.

New inquiries before the New York trade include one from the Submarine Boat Corporation, which has a large shipyard at Port Newark, N. J., for 100 16-in. engine lathes, 100 20-in. upright drills and 100 emery grinders, all motor driven. These tools are to be installed on merchant ships being built at the Submarine plant. Another good-sized inquiry comes from the Standard Oil Co. of New Jersey, which requires about 50 machines for a ship repair plant at Bayway, N. J. The list includes about a dozen punches and shears, a plate planer and miscellaneous machine tools.

One of the largest machinery orders placed in this country for export since the war ended has been closed by F. E. Robert & Co., Philadelphia, engineers, for the steel plant of Sota & Aznar in Spain. The machinery purchased includes rolling mills, large cranes, machine tools, etc. The French High Commission, New York, has practically completed purchases of about 150 machine tools for reconstruction work in France.

Still Buying Heavily

The Navy Department has been a consistent and steady buyer of machine tools for several months, the ending of the war having made no appreciable change in its program. One of the largest of the navy projects is the armor plate and naval ordnance plant at Charleston, W. Va., for which \$3,500,000 to \$4,000,000 worth of very large machine tools were purchased a few months ago. Recent purchases have covered equipment for a new torpedo station at Alexandria, Va., and tools for various shipyards. Extensions are being made at practically all of the navy yards, but particularly at Norfolk, Va.; Boston, Brooklyn and Mare Island, Cal.

The machine-tool trade is expecting that the railroads will soon come into the market. The first railroad list of importance in months has been issued at Chicago by the Chicago, Burlington & Quincy for about 50 tools. Several of the roads in the East are known to have buying programs in contemplation but these have been held up awaiting funds. Now that railroad financing plans are under way it is expected that money may soon be provided for necessary betterments.

Many Used Tools

A great many second-hand tools from war plants are now being offered. The International Arms & Fuse Co., Bloomfield, N. J., which recently issued a list of about 1,000 used tools, which it offered for sale, has had fair success in disposing of them. It is expected that the entire

equipment of the plant of the Wright-Martin Aircraft Corporation, Long Island City, N.Y., will soon be placed on the market. At a recent sale of the equipment of the Stenotype Co., Indianapolis, Ind., users of tools made bids for a great deal of the equipment which were higher than dealers were willing to pay. Milling machines in particular were in demand.

FAIRBANKS-MORSE HAD RECORD YEAR

Earnings on Common After All Deductions Total \$710,097

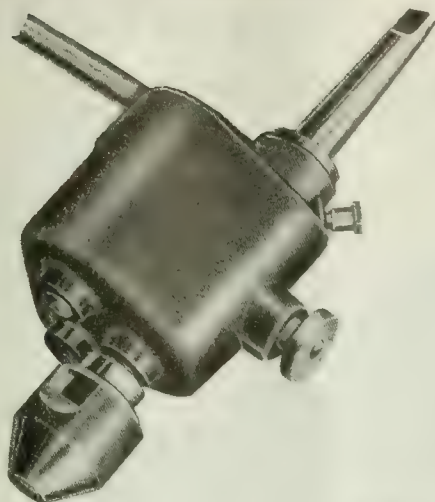
Montreal.—A record year, both from the standpoint of the volume of business handled and that of profit, is disclosed in the annual report of the Canadian Fairbanks-Morse Company, Limited, for 1918, now being sent to the shareholders. After providing for depreciation, war taxes and allowing a full year's dividends on the preference shares of the company, the balance earned for the common shareholders was \$710,097, as compared with \$691,973 in 1917, \$546,629 in 1916, and \$619,048 in 1915. The earnings shown in 1918 represented 44.38 per cent. on the \$1,600,000 common stock, against 43.2 per cent. in 1917 and 34.2 per cent. in 1916. Dividends of 18 per cent. were paid on the junior issue of the company in 1918, as compared with 26 1-8 per cent. in 1917, and 10 per cent. in 1916.

Present Surplus \$1,762,537

After all dividend requirements were liquidated there remained a balance of \$422,097 to add to the amount brought forward from 1917, bringing the total surplus up to the substantial figure of \$1,762,537. The surplus of \$1,762,537 represents the equivalent of nearly 57 per cent. on the combined issues of \$1,500,000 preference shares and \$1,600,000 common. A survey of the balance sheet to be submitted to the shareholders indicates a comfortable financial position and shows several interesting changes from last year. The company ended the year 1918 with \$519,861 cash on hand, with no bank loans and with an excess of current assets over liabilities of more than \$4,300,000.

The balance sheet shows an increase of over \$630,000 in inventories and nearly \$1,000,000 in accounts receivable. Another feature of the balance sheet is the disappearance in the 1918 exhibit of any allowance for deferred charges, as against an item of \$472,982 carried in the 1917 statement.

The president's report further states: "With the signing of the armistice, work at the Toronto factory on munitions ceased. During the war period the effort of this department was concentrated entirely on the production of shells, thus contributing in a measure to the success of our armies in the field. We have put aside the sum of \$150,000 for the purpose of plant rehabilitation and are already producing some of our established lines at Toronto. The outlook for the future is promising and we expect that the results for the coming year will be satisfactory."



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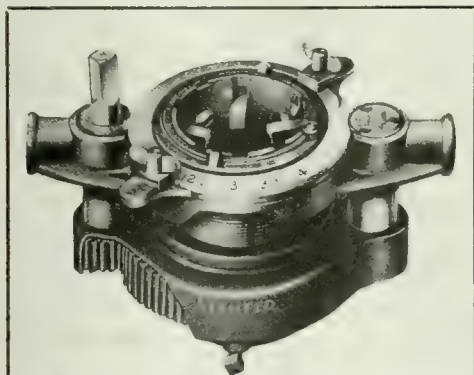
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NO CHANGING**

Beaver Threaders are Easy Workers. Narrow, receding dies are used which automatically move outward as the thread advances, so that less metal is removed and the work grows continually easier. With Beaver Die Stocks 2-inch steel pipe may be threaded easily with one hand; and 4, 6, 8, 10 and 12-inch pipe may be threaded by one man.

No Changing Dies. Because of the narrow, lathe-like chasers, Beaver Die Stocks will thread several sizes of pipe—not possible with old style die construction. The dies are instantly adjusted to any size of pipe.

This eliminates the nuisance of having to fumble around in a dark corner with greasy hands, looking for the proper set of dies.

No Bushings. Beaver Die Stocks, 2-inch and smaller, use a self-centering chuck—thus eliminating troublesome bushings.

Adjustable. With Beaver you "move the handle—that's all." No dies to change up to four-inch; no bushings up to two-inch. Your men can cut a thread with Beavers, while changing dies and bushings in other tools. Beavers are the most economical tools to use.

Beaver Guarantee. Every Beaver tool is guaranteed to satisfy in every respect. "The user must be pleased"—that's our policy. Write for full particulars.

AIKENHEAD HARDWARE LIMITED

17, 19, 21 Temperance St., TORONTO, Ont.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	\$27 15
Lake Superior, charcoal, Chicago	34 60
Standard low phos., Philadelphia	
Bessemer, Pittsburgh	29 35
Basic, Valley furnace	25 75
Toronto price:—	
Silicon .225% to 2.75%	\$32.75 to \$35.75

Government prices

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	\$ 4 40
Steel bars, base, Toronto	4 40
Steel bars, 2 in. to 4 in. base	5 50
Steel bars, 4 in. and larger base	6 00
Iron bars, base, Montreal	4 55
Steel bars, base, Montreal	5 05
Reinforcing bars, base	4 50
Steel hoops	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	4 40
Chequered floor plate, 3-16 in.	9 25
Chequered floor plate, 1/4 in.	9 00
Staybolt iron	8 50
Bessemer rails, heavy, at mill.	
Steel bars, Pittsburgh	2 35
Tank plates, Pittsburgh	2 65
Structural shapes, Pittsburgh	2 45
Steel hoops, Pittsburgh	3 30
F.O.B., Toronto Warehouse	
Steel bars	4 40
Small shapes	4 50
F.O.B. Chicago Warehouse	
Steel bars	4 10
Structural shapes	4 20
Plates	4 45

FREIGHT RATES

	Per 100 lbs.	C.L.	L.C.L.
Pittsburgh to Following Points			
Montreal	29	39 1/2	
St. John, N.B.	47 1/2	63	
Halifax	49	64 1/2	
Toronto	23 1/2	27 1/2	
Guelph	23 1/2	27 1/2	
London	23 1/2	27 1/2	
Windsor	23 1/2	27 1/2	
Winnipeg	81	106 1/2	

METALS

Lake copper	\$19 00	\$20 00
Electro copper	18 50	19 00
Castings, copper	17 25	19 00
Tin	60 00	58 00
Spelter	9 00	8 50
Lead	6 75	7 50
Antimony	8 00	8 50
Aluminum	35 00	40 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, 1/4 up	\$ 5 50	\$ 4 50
Plates, 3-16 in.	5 75	4 90

Price List No. 38

Standard Butt weld

	Per 100 feet	
1/8 in.	\$ 6 00	\$ 8 00
1/4 in.	4 68	6 81
3/8 in.	4 68	6 81
1/2 in.	6 21	7 78
3/4 in.	7 82	9 95
1 in.	11 56	14 71
1 1/4 in.	15 64	19 90
1 1/2 in.	18 70	23 78
2 in.	25 16	32 01
2 1/2 in.	40 37	51 19
3 in.	52 79	66 94

3 1/2 in.	67 16	84 18
4 in.	79 57	99 74
Standard Lap weld		
2 in.	38 81	35 34
2 1/2 in.	42 12	52 36
3 in.	55 08	68 47
3 1/2 in.	69 00	86 94
4 in.	81 75	103 00
1 1/2 in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8 in.	1 93	2 44
8 1/2 in.	2 22	2 81
9 in.	2 66	3 36
10 in.	2 46	3 12
10 1/2 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES

4" and under, 45%.
4 1/2" and larger, 40%.
4" and under, running thread, 25%.
Standard couplings, 4" and under, 35%.
4 1/2" and larger, 15%.

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds	Montreal	Toronto
Copper, light	\$10 50	\$10 00	
Copper, crucible	13 00	12 75	
Copper, heavy	13 00	12 75	
Copper wire	13 00	12 75	
No. 1 machine composition	10 00	12 00	
New brass cuttings	8 00	9 00	
Red brass turnings	8 00	8 50	
Yellow brass turnings	6 00	6 00	
Light brass	5 00	5 00	
Medium brass	8 00	6 00	
Scrap zinc	4 00	5 00	
Heavy lead	3-4	4 00	
Tea lead	2-3	3 00	
Aluminum	15 00	12 00	
Per Ton			
Heavy melting steel	10 00	9 00	
Shell turnings	6 00	6 00	
Boiler plate	12 00	8 00	
Axles (wrought iron) ..	20 00	15 00	
Rails	15 00	11 00	
Malleable scrap	15 00	12 00	
No. 1 machine cast iron ..	18 00	14 00	
Pipe wrought	9 00	5 00	
Car wheels	20-22	18 00	
Steel axles	22 00	20 00	
Mach. shop turnings	6 00	5 00	
Stove plate	14 00	10 00	
Cast boring	8 00	8 00	

BOLTS, NUTS AND SCREWS

	Per Cent
Carriage bolts, 3/8" and less	10
Carriage bolts, 7-16 and up	net
Coach and lag screws	25
Stove bolts	55
Plate washers	List plus 20
Elevator bolts	5
Machine bolts, 7-16 and over	net
Machine bolts, 3/8 and less	10
Blank bolts	net
Bolt ends	net
Machine screws, fl. and rd. hd., steel	27 1/2
Machine screws, o. and fil. hd., steel ..	10

Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fil. hd. brass	add 25
Nuts, square blank	add \$1 50
Nuts, square, tapped	add 1 75
Nuts, hex., blank	add 1 75
Nuts, hex., tapped	add 2 00
Copper rivets and burrs, list plus ..	30
Burrs only, list plus	50
Iron rivets and burrs	25
Boiler rivets, base 3/4" and larger ..	\$8 50
Structural rivets, as above	8 40
Wood screws, flat, bright	72 1/2
Wood screws, O. & R., bright	67 1/2
Wood screws, flat, brass	37 1/2
Wood screws, O. & R., brass	32 1/2
Wood screws, flat, bronze	27 1/2
Wood screws, O. & R., bronze	25

MILLED PRODUCTS

	Per Cent
Set screws	25
Sq. and Hex. Head Cap Screws ..	20
Rd. and Fil. Head Cap Screws	net
Flat But. Hd. Cap Screws	plus net
Fin. and Semi-fin. nuts up to 1 in.	25
Fin. and Semi-fin. nuts, over 1 in., up to 1 1/2 in.	20
Fin. and Semi-fin. nuts over 1 1/2 in., up to 2 in.	plus 10
Studs	net
Taper pins	40
Coupling bolts, plus	10
Planer head bolts, without fillet, list plus	10
Planer head bolts, with fillet, list plus 10 and	10
Planer head bolt nuts, same as finished nuts	net
Planer bolt washers	net
Hollow set screws	list plus 20
Collar screws	list plus 30, 10
Thumb screws	20
Thumb nuts	65
Patch bolts	add 40, 10
Cold pressed nuts to 1 1/2 in.	add \$4 50
Cold pressed nuts over 1 1/2 in.	add 7 00

BILLETS

	Per gross ton
Bessemer billets	\$38 50
Open-hearth billets	38 50
O.H. sheet bars	42 00
Forging billets	51 00
Wire rods	52 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

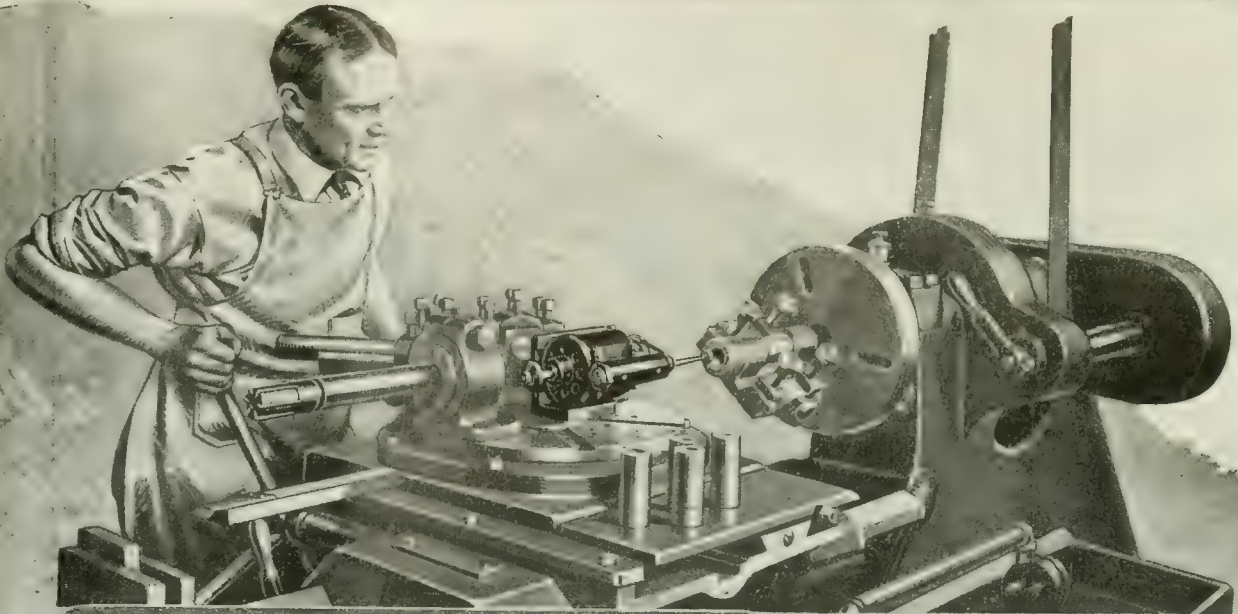
Wire nails	\$5 50	\$5 30
Cut nails	5 85	5 65
Miscellaneous wire nails		60%
Spikes, 3/4 in. and larger	\$7 50	
Spikes, 1/4 and 5-16 in.	8 00	

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, 1/4-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net
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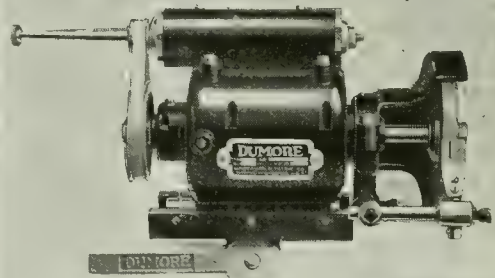
GRINDING HARDENED BEARINGS IN PLACE

STARTING and finishing this job with one set-up—from machining the casting to grinding the hardened bearing in place—is a good illustration of the **DUMORE** grinder on production. This method positively aligns each bearing with the rest of the machining, by tempering. And the danger of chatter-marks, taper or bell-mouth is eliminated because the **DUMORE** grinder is perfectly balanced throughout and gives correct cutting speeds to even small emery wheels. Limits of .0001" are easily maintained.

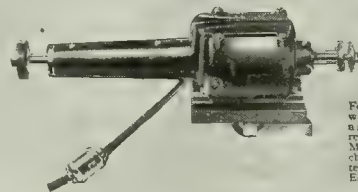
There are any number of jobs in your shop for the **DUMORE** grinder which this illustration will suggest. Give your workmen the use of a tool that will speed their work, turn out better tools and improve the quality of your product. The **DUMORE** grinder is light and portable—may be carried anywhere in the shop and quickly set up.

Ask your dealer for a demonstration. If he is not able to supply your needs, write us for further information and prices.

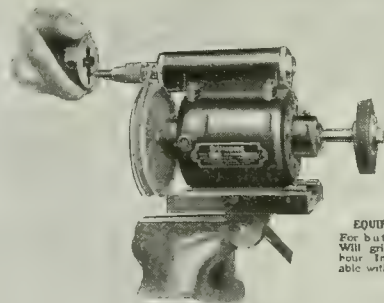
WISCONSIN ELECTRIC COMPANY
2910 Sixteenth Street Racine, Wis.



EQUIPMENT A
For general tool room use. Includes High Speed Internal Spindle. A with reach of 3 inches. 10,000 R.P.M. Comes fully equipped. Weighs 17½ pounds.



EQUIPMENT B
For deep internal work. Extension arm has 10-inch reach. 10,000 R.P.M. Arm interchangeable with internal spindle of Equipment A.



EQUIPMENT C
For button dies. Will grind 20 an hour. Interchangeable with A and B.

DUMORE HIGH SPEED GRINDERS

MISCELLANEOUS

Solder, strictly	0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll ...	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal. 1 10	
Linseed oil, raw, single bbls. .	1 70
Linseed oil, boiled, single bbls. 1 73	
Plaster of Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	list plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular.	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

	Per Cent.
S.S. drills, wire sizes up to 52 ...	35
S.S. drills, wire sizes, No. 53 to 80	40
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	40
3-fluted drills, plus	10
Jobbers' and letter sizes	40
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	40
Sleeves	40
Taper pin reamers	net
Drills and countersinks... list plus	40
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	75
High speed cutters, list plus	40

COLD ROLLED SHAFTING

At mill	list plus 40%
At warehouse	list plus 60%
Discounts off new list. Warehouse price at Montreal and Toronto	

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15¾c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28. \$ 6 25	\$ 6 25	
Sheets, black, No. 10. 5 25	5 25	
Canada plates, dull, 52 sheets	8 50	8 00
Can. plates, all bright	8 50	9 00
Apollo brand, 10% oz. galvanized		
Queen's Head 28 B.W.G.		
Fleur-de-Lis 28 B.W.G.		
Gorbal's Best, No. 28.		
Colborne Crown, No. 28		
Premier, No. 28 U.S.		7 85
Premier, 10% oz.		8 50
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

¼ in., \$14.35; 5-16 in., \$13.85; ¾ in., \$13.50; 7-16 in., \$12.90; 1 in., \$13.20;

\$13.00; ¾ in., \$12.90; 1 inch, \$12.65; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

ELECTRIC WELD COIL CHAIN B.B.
¾ in., \$13.00; 3-16 in., \$12.50; ¼ in., \$11.75; 5-16 in., \$11.40; ¾ in., \$11.00; 7-16 in., \$10.60; 1 in., \$10.40; 1½ in., \$10.00; ¾ in., \$9.90.

Prices per 100 lbs.

FILES AND RASPS.

	Per cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	32½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	\$28 00	\$.
1¼ in.	32 00	
1½ in.	35 00	28 00
1¾ in.	35 00	28 00
2 in.	40 00	28 00
2¼ in.	43 00	30 00
2½ in.	45 00	35 00
3 in.	52 00	40 00
3¼ in.		47 00
3½ in.	62 00	48 00
4 in.	70 00	60 00

Prices per 100 ft., Montreal and Toronto les 10.

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal., bulk	19½
Palacine	22½
Machine oil, per gal.	27½
Black oil, per gal.	16
Cylinder oil, Capital	52
Cylinder oil, Acme	39½
Standard cutting compound, per lb. 0 06	
Lard oil, per gal.	\$2 60
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	10½

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double. .	30%
Standard	30,10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES.

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES.

Polishing wheels, felt	3 25
Polishing wheels, bull-neck. .	2 00
Emery in kegs, American.	07
Pumice, ground	3½ to 05
Emery glue	23 to 30
Tripoli composition	06 to 09
Crocus composition	08 to 10
Emery composition	08 to 09
Rouge, silver	35 to 50
Rouge, powder	30 to 45

Prices Per Lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.06

BRASS

Brass rods, base ½ in. to 1 in. rod	0 38
Brass sheets, 24 gauge and heavier, base	0 43

Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

White	Cts. per lb.
XXX Extra. 19½	Atlas 17
Peerless 19	X Empire 15½
Grand 18	Ideal 16
Superior 18	X press 14
X L C R 17	

Colored.

Lion 15	Popular 12
Standard ... 13½	Keen 10½
No. 1 13½	

Wool Packing.

Arrow 25	Anvil 15
Axle 20	Anchor 11

Washed Wipers.

Select White. 11	Dark colored. 09
Mixed colored 10	

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard ... 10%	Best grades .. 15%
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ANODES.

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices Per Lb.

COPPER PRODUCTS.

	Montreal	Toronto
Bars, ½ to 2 in.	\$42 50	\$43 00
Copper wire, list plus 10. .		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6 x 4 base	45 00	44 00

LEAD SHEETS.

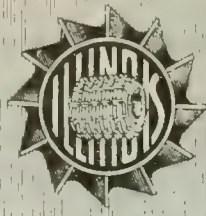
	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$10 25	\$11 50
Sheets, 3½ lbs. sq. ft.	10 00	11 00
Sheets, 4 to 6 lbs. sq. ft. 9 75	9 75	10 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

PLATING CHEMICALS.

Acid, boracic	\$.25
Acid, hydrochloric	.06
Acid, nitric	.14
Acid, sulphuric	.06
Ammonia, aqua	.23
Ammonium carbonate	
Ammonium, chloride	.55
Ammonium hydrosulphuret	.30
Ammonium sulphate	.15
Arsenic, white	.27
Copper, carbonate, annhy	.50
Copper, sulphate	.22
Cobalt, sulphate	.20
Iron perchloride	.40
Lead acetate	.35
Nickel ammonium sulphate	.25
Nickel carbonate	.32
Nickel sulphate	.35
Potassium carbonate	1.80
Potassium sulphide (substitute)	2 25
Silver chloride (per oz.)	1.45
Silver nitrate (per oz.)	1.20
Sodium bisulphite	.15
Sodium carbonate crystals	.05
Sodium cyanide, 127-130%	.40
Sodium hydrate	.22
Sodium hyposulphite, per 100 lbs.	6.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.80
Zinc sulphate	.15

Prices per lb. unless otherwise stated.

None Better

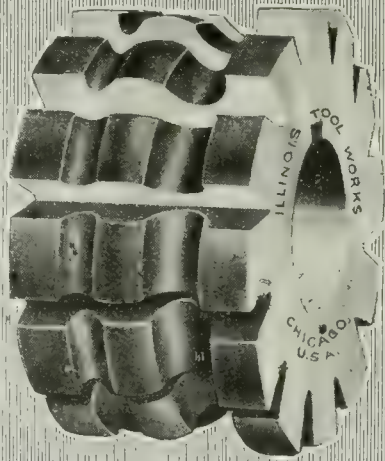
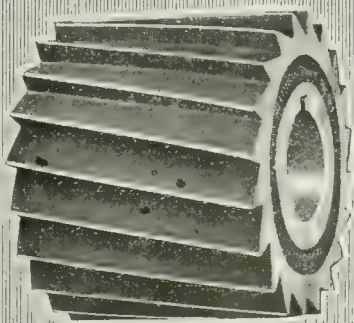
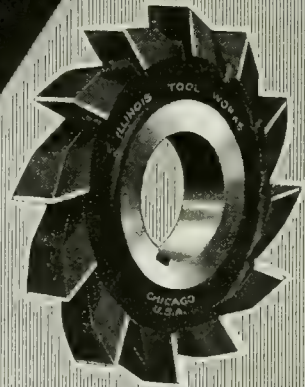
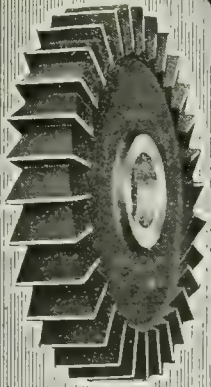


can be Made

ILLINOIS

CUTTERS

No matter how difficult
your cutter requirements
may be, it is probable
that we have solved
similar milling
problems for others.



ILLINOIS TOOL WORKS, CHICAGO.

Detroit Store 997 Woodward Avenue. Represented by A. C. Towne & Co., Buffalo. Louis G. Henes, 75 Tremont St., San Francisco and Title Insurance Building, Los Angeles.

How to Locate Export Trade for Canada

Things That the Canadian Manufacturer Would Do Well to Bear in Mind—Ask Specific Questions and Make Use of the Trade Commissioner's Service

HERE are certain things that the Canadian manufacturer should bear in mind when completing his preparations for foreign trade. Attention to these will have much to do with the success or failure of any selling plans that may be contemplated. CANADIAN MACHINERY, in conversation with an authority on this matter, secured considerable information that should be helpful.

In the first place the Canadian firm that is desirous of securing export business should make use of existing service provided for that purpose. Following is the correct list of representatives of the Canadian Trade Commission:

Argentina Republic—B. S. Webb, Reconquista No. 46, Buenos Aires. Cable address: Canadian.

Australia—D. H. Ross, Box 140, G.P.O. Melbourne office, Stock Exchange Bldg., Melbourne. Cable address: Canadian.

British West India Islands and British Guiana—E. H. S. Flood, Bridgetown, Barbadoes. Cable address: Canadian.

China—J. W. Ross, 13 Nanking Road, Shanghai. Cable address: Cancoma.

Cuba—J. C. Manzer, 501 and 502 Antigua Casa de Correos, Teriente Rey 11, Havana. Cable address: Cantracom.

France—Phillippe Roy, Commissioner-General, 17 and 19 Boulevard des Capucines, Paris. Cable address Stadacona.

Holland—Ph. Geleerd, Acting Trade Commissioner, Zuidblaak 26, Rotterdam. Cable address: Watermill.

Italy—W. McL. Clarke, via Carlo Cataneo 2, Milan. Cable address: Canadian.

Japan—A. E. Bryan, 53 Main Street, Yokohama. Cable address: Canadian.

Newfoundland—W. B. Nicholson, Bank of Montreal, Water Street. St. John's, Newfoundland. Cable address: Canadian.

New Zealand—W. A. Beddoe, Union Bldgs. Customs Street, Auckland. Cable address: Canadian.

Siberia—L. D. Wilgress, Suifunskava Street, 10, Vladivostok. Cable address: Canadian.

South Africa—W. J. Egan, Norwich Union Bldgs., Cape Town. Cable address: Cantracom.

United Kingdom—Harrison Watson, 73 Basinghall Street, London, E.C.2, England. Cables: Sleighing, London; J. Forsyth Smith, Acting Canadian Trade Commissioner, 87 Union Street, Glasgow. Cable address: Cantracom; J. E. Ray, 4 St. Ann's Square, Manchester. Cable address: Cantracom; J. Forsyth Smith, Century Bldgs., 31 North John Street, Liverpool. Cable address: Cantracom; N. D. Johnston, Sun Bldg., Clare St., Bristol. Cable address: Canadian.

Canadian Commercial Agents:

Australia—B. Millin, Royal Exchange Bldg., Sydney, N.S.W., Australia.

British West Indies—Edgar Tripp, Port of Spain, Trinidad. Cable address: Canadian; R. H. Curry, Nassau, Bahamas.

Norway and Denmark—C. E. Sontum, Grubbegd, No. 4, Christiania, Norway. Cable address: Sontums.

Have Other Help

Recently the British Trade Commission has made arrangements so that the services of its representatives can be made to serve any part of the British Empire where a trade commission is not already located. The list of British Trade Commissioners follows:

At Headquarters

C. Hamilton Wickes, 73 Basinghall Street, London, E.C.2.

Canada

Montreal—G. T. Milne, 367 Beaver Hall Square, Montreal. Telegraphic address: Britcom.

Toronto—F. W. Field, 257-260 Confederation Life Bldg., Toronto. Telegraphic address: Toroncom.

Newfoundland—G. T. Milne.

Australia

Melbourne—S. W. B. McGregor, Commerce House, Flinders Street, Melbourne.

Sydney—The Officer in Charge, H.M. Trade Commissioner's Office, Royal Exchange, Sydney.

New Zealand

Wellington—R. W. Dalton, P.O. Box 369, Wellington.

South Africa

Johannesburg—W. G. Wickham (at present c/o Trade Commissioner's Office, Cape Town).

Cape Town—J. L. Wilson-Goode, P.O. Box 1346 Norwich Union Bldgs., Cape Town.

India and Ceylon

Calcutta—T. M. Ainscough, O.B.E., McLeod Buildings, 28 Dalhousie Square, Calcutta.

Straits Settlements

Singapore—P. J. McKellen (at present stationed at headquarters).

British West Indies and British Honduras
Trinidad—A. J. Pavitt, Port of Spain, Trinidad.

Must Be Specific

Above all else inquiries sent to any of these men should be specific and very much to the point. There are letters and catalogues sent out that might just as well be dropped in the waste paper basket here as elsewhere. British firms make a practice of working their trade commissioners for all they are worth. As an instance of this, one firm communicated to the Canadian office and presented a direct list of forty-two questions, each of which required a great deal of research work. The digging up of this material took up almost two weeks,

and proved to be a valuable document for the enquirer and also for the office, as it was thus enabled to be in possession of a large amount of information that had not previously been available.

Point to Remember

When writing to the Trade Commissioners remember that they may know nothing of your business; they may be strangers to your best lines. Do not trust to a catalogue and a rubber stamp letter turning the trick. Ask for these:

Prices that are paid for similar lines in the country you wish to enter.

Competitive lines that are now on the market.

Change in the markets and marketing conditions owing to the war.

Progress made by local firms making these lines. It is important to keep this information up to date as in nearly every country an effort is being made to produce at home the lines that have been extensively imported.

Value of the market. By this we mean an estimate of the possible amount of goods likely to be purchased in the district.

Merits of the competing lines. It is very necessary to know this in detail.

Differences in the selling methods employed. This includes the important matter of credit, terms, collections, etc.

What sort of representation a firm should have. Get a list of suitable firms or importers.

Changes in tariffs. In fact get all information about this matter and keep it up-to-date as frequent changes are made.

Ask for the best way to ship and pack.

Use the trade papers of the lines you want to reach if such publications are available.

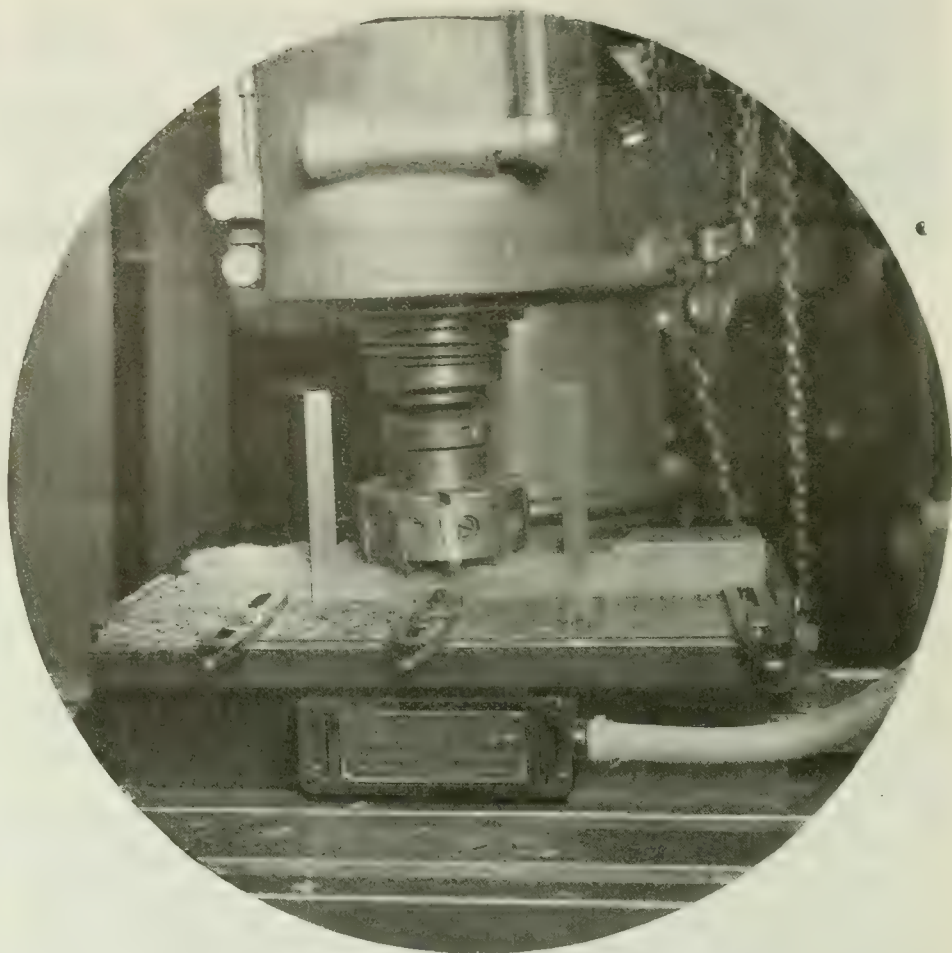
The British Commission

Although Canadian firms are more vitally interested in the Canadian Trade Commissioners, it is interesting to note the scope of the work carried on by His Majesty's Trade Commissioners.

The primary duty of His Majesty's Trade Commissioners appointed in various parts of the British Empire, comprises the collection of information in regard to opportunities that may arise for securing and developing the trade of the United Kingdom and such other parts of the British Empire as may express a desire to avail themselves of the facilities afforded by the Trade Commissioner Service, but it is also a part of their general duty to endeavor to promote the trade of the British Empire as a whole, within the area to which they appointed.

Instruction are also given to Trade Commissioners to report from time to time to the Board of Trade and to the Governments of such parts of the British Empire as may invite them to do so, all

Holding a $\frac{5}{16}$ " x 2" cut in Cast Iron on Simmons' Magnetic Chuck



Here is an example of the "grip" of a Simmons Chuck used on a No. 5 Brown & Sharpe Vertical Milling Machine.

On a piece of cast iron 16" by 2" by 1½" held by an 8" x 18" chuck, a cut 5-16" deep was made across the entire piece. The feed

was 12½" per minute; the cutter was a 5" diameter inserted tooth face mill, running at a speed of 100 R.P.M. Current used by the chuck, .4 amp. at 110 volt. The strongest "grip," with the least current—and no leakage of magnetism into frame of chuck or machine. It is powerful and yet it conserves electricity.

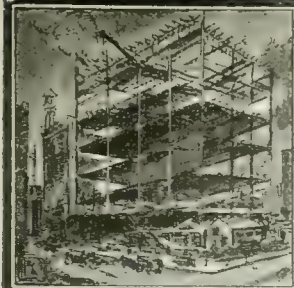
Bulletin 103E describes Simmons' Magnetic Chucks.

TAFT-PEIRCE
Woonsocket, R.I., U.S.A.

New York Office, Woolworth Building

2070

Detroit Office, Majestic Building



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS
PERSONAL AND TRADE NOTES



CONTRACTS

Brantford.—Schultz Bros. Co., Ltd., has secured contracts for the supply of interior hardwood finish for the Union station, Toronto, and for the erection of a new three-storey mill building for the Riverside Silk Mills, Galt.

ENGINEERING

Welland.—Crowland township council at a meeting let the contract for installing 16,470 feet of water mains in the Crowland industrial section. Six tenders in all were received, ranging from 60 cents to 95 cents a foot. The contract was let to the lowest tenderer, Mitchell & Mohan, of London, at 60 cents. Work will begin at once. The council some time ago made the purchase of the necessary pipe.

Ottawa.—As the result of a conference it was decided to at once call for tenders for 250,000 ties to be used in connection with the further construction of the Hudson Bay railway. It is practically certain that, as the result of representations made by Western members, that in addition to the securing of ties, some construction work on the line on the bay will be done this season, and the line completed in all probability before the end of the summer of 1920.

matters affecting, or likely to affect, the trade, industry, and commerce of their area that may come under their notice.

The Trade Commissioners are also directed to furnish information in regard to tariffs, subsidies, bounties, contracts, open, or likely to be open, for tender, the opening of new industries, the extension of public works, financial and trade conditions, and other matters of commercial interest, whilst they are to report, as occasion required, on the nature and extent of foreign competition in local markets so far as it affects British trade.

An important part of the work of the Trade Commissioners is to compile and furnish periodically the names of principal importers and buyers of British goods in the different localities of the area in which they act, with an indication of the classes of goods in which they deal, and also to compile an agency record in respect of firms or persons holding agencies for firms domiciled in the various parts of the British Empire and in foreign countries, supplemented by lists of firms

MARINE

Toronto.—Announcements are posted that the S. S. Dalhousie City opens the season's trips on March 31, taking passengers and freight. She leaves Toronto at 5 p.m., and Port Dalhousie at 8.30 a.m.

Dunnville.—The T., H. & B. car ferry Maitland has been laid up for a few weeks for repairs. The boat has made a record in lake navigation, having been on the run between Ashtabula, Ohio, and Fort Maitland on the Grand River, continuously since April 1 of last year, excepting when delayed by freight shortage. A return trip has been made across the lake every fifteen hours in every sort of weather for practically one year.

Midland.—The second steel vessel being constructed by the Midland Shipyard Co. to the order of the Imperial Munition Board is now rapidly nearing completion. The steel structural work has been finished and the machinery is being placed in the vessel so that she will be ready for launching as soon as the ice begins to move. Carpenters are now at work placing the deck houses and fitting out the officers' quarters. The vessel is a duplicate of the "War Fiend" which sailed last fall and recently sailed from St. John for Gibraltar.

or persons desirous of acting as agents for firms domiciled in the various parts of the British Empire. They also are to acquaint the Department of Overseas Trade with information in regard to important trade exhibitions or agricultural shows, etc., open to British exhibitors which it may be proposed to hold in their area. Special importance is attached to their obtaining and forwarding to the Board of Trade from time to time samples of:

1. Articles of foreign manufacture which may appear to be displaying British goods of a similar kind in the local markets.

2. Any new or little known natural or manufactured products of their area (such as minerals, fibre, earth, etc.) which appear likely to be of use for industrial purposes.

Canada has an extensive system of trade commissioners. It is up to the manufacturers to make use of them. The effort is well worth the making.

Port Dover.—This community is dissatisfied with the amount which has been put in the estimates for the improvement of Port Dover Harbor. Reeve R. M. Taylor has been invited to attend the meeting which is to be held in Brantford, at which representatives of all the municipalities along the Lake Erie & Northern and Grand Valley Electric Railways will be present to discuss the matter. It is understood that an indignation meeting will be held in the Telephone City to be followed by the sending of a strong deputation to Ottawa to impress forcibly on the minds of those in authority that something worth while must be done, and soon, in regard to Port Dover harbor.

Toronto.—George S. McKellar, operating manager of the Dominion Shipbuilding Company, denies a report that fifty men a day are discharged at the company's plant because of lack of work. "We are building six ships at the present time," he said. "About two weeks ago we laid off 150 men on account of the non-arrival of a big shipment of steel. We are expecting this material any day now, and as soon as it comes the men will all be taken on again. There are about 1,000 men on our payroll now." Asked as to the prospects for further contracts for ships, Mr. McKellar said: "We are waiting to see what the Government is going to do in the way of shipbuilding. However, I think the prospects are all right."

New York.—Edward N. Hurley, chairman of the United States Shipping Board, addressing the National Marine League here to-night, presented for consideration an American ship-operating program. He reviewed his plan in part as follows: The Government-owned ships should be sold to and operated by American citizens at a price which fairly reflects the current world market for similar tonnage. Twenty-five per cent. of the purchase price of each ship should be paid down, the remainder falling due and payable in graded annual instalments over a period not exceeding ten years. It is understood that no transfer of a vessel to foreign registry should be permitted without express permission of the Government.

London.—J. W. Isherwood, inventor of the Isherwood longitudinal system of ship construction, who recently paid a visit to America, and has returned to England, predicts a world shipping boom for the next three or four years, and

makes the statement that the United States will inevitably advance and will become England's greatest competitor. He said that it is not probable that America will produce such a plentiful supply of ships as to revolutionize sea carrying, nevertheless that country is bound to become England's greatest

LOOK AFTER BOTH IMPORT AND EXPORT

MONTREAL.—At the present time reconstruction is more of a byword than a password and yet there are none of us can afford to lose the opportunity of doing our fair share toward the problem of readjusting the abnormal business and industrial conditions subsequent to the ending of the world war. The market situation to-day is not as we would wish it and, as a matter of fact, is due to circumstances over which we have no control, but the sooner we attack the problem, and also, the more "horse-sense" we use, the better we can assist in bringing prices, market conditions, supply and demand, to a level where we can all do business, and at a profit. Pre-war prices, present day prices, and the prices we would all desire to make, are of totally different proportions, and the sooner we quit "shopping" and get firm prices, firm delivery, and buy and sell, instead of using paper and ink, and "hot air," the sooner will the meaning of the word "reconstruction" be made clear to us. As a matter of fact, we have had innumerable inquiries for commodities, domestic and export, we have had our mills and correspondents give us best prices and delivery, rock bottom prices, and that is the end, or rather the beginning of the end; markets are disturbed, everyone is out to get what he can and proper trading is impossible.

To endeavor to secure a fair share of legitimate business, the International Metal and Trading Co., have opened offices at 406 McGill building, Montreal, P.Q., with an organization competent to handle both import and export business. They have completed business relations with important houses in South America, the far East, India and South Africa, and are ready to handle any commodities suitable for these countries.

Negotiations are under way for the purchase of considerable new material for South America, and the plans laid out for the expansion of trade between Canada and there are well under way. The International Metal and Trading Co. extend their services to anyone in the market for staple products, also for second-hand material. Their scrap department is efficiently organized and in close touch with market developments.

To Manufacturers Seeking Locations

The Success of Your Industry Depends Upon Your Choice of Location

Complete, up-to-date information on shipping facilities, power rates, labor conditions, raw materials, factory sites, municipal inducements, etc., for every commercial centre in Ontario.

Complete details, plans and photographs of over 60 available vacant factories in Ontario, 1,000 to 100,000 square feet floor space.

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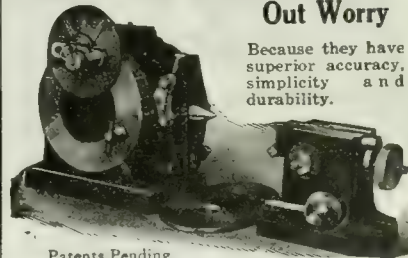
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JOBGING

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Patents Pending



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Heated by Gas, Electricity,
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HAWK D CHROME VANADIUM STEEL

You Know How Greatly it Increased Production

You know how it proved to be without equal for both first and second operation punches—how, in both Canadian and American shell plants, this heat-treated ready-for-use steel enabled each punch to turn out over 2,000 shells.

Hawkrige Brothers' steel for every commercial requirement is just such production-increasing steel as proved this "Hawk" D. Chrome Vanadium. We make

Steel of Every
Description

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303 Congress St., BOSTON, MASS.
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PATENTS FOR SALE

Two Canadian Patented Steam Specialties for sale; one Steam Trap, Patent Number 187215, and one Steam Separator, Patent Number 183340.

Allentown Experimental Works

Allentown, Pa., U.S.A.

competitor. It is true that workers are paid higher wages in American shipyards than in British shipyards, but they will produce ships quicker and cheaper, and if England does not wake up she will be left as a shipbuilding nation.

St Catharines.—Capt. James P. Delaney died early Friday morning. Those simple words will carry a message that will be heard with deep regret in every port of Canada's waterways. Boy and man, "Jim" Delaney had sailed the inland seas. He rose from cabin boy at ten years of age to master on his first ship, the "Lake Michigan. When the old canal was the great connecting link between Ontario and Erie, Captain Delaney was a well-known sailor; in later life he commanded some of the finest steamships afloat, and then assumed the important duties of a St. Lawrence River pilot. For years he was a master mariner in the employ of the Matthews Transportation Company, and brought up many of their finest steamers on their initial trips to the Great Lakes, the "Haddington," "Beaverton," "Eastern," "Wacondah," and others. He appeared to be a natural-born navigator. During his long period of service, through all kinds of weather, he never lost a ship; in fact, it may be said that he never had a serious mishap. About five years ago he became a pilot for the American Government, and handled many naval gunboats on their trips to the seaboard.

PERSONAL

John A. Greig, of Ross and Greig, has been elected president of the Caledonian Society of Montreal.

The death occurred, on Monday, March 24, of R. A. Hogge, purchasing agent for the past few years for the Steel Company of Canada in Montreal. Mr. Hogge was born in Dumfries, Scotland in 1886, coming to Canada in 1910. After a period of service with Messrs. Hugh Russell and Sons, iron and steel merchants, he entered the employ of the Steel Co. of Canada in 1912 as clerk in the works office, subsequently being promoted to purchasing agent.

TRADE GOSSIP

To Stimulate Thrift.—Among their employees the Canada Car and Foundry Co. has organized a War Saving Society, through the co-operation of which it is expected to work up an enthusiastic spirit among the men. The company will present a shield to the factory obtaining the largest percentage of subscribers, and it will become the property of the plant having the greatest enrolment at the end of six months.

Wants Information.—Lieut.-Colonel W. H. Price, who roused the Ontario House by his slashing attack upon war profiteering in Canada, will follow up his opening assault by putting the members of the Legislature on record on the matter. The Parkdale member, if occasion offers, will introduce a resolution asking the Dominion Government to

request from the Imperial Munitions Board a statement of the moneys spent on munitions in Canada during the war and the profits made upon munition contracts.

Contemplated Expansion.—Peacock Bros., of Montreal, who for many years have been Canadian agents for G. and J. Weir, Limited, of Glasgow, are now manufacturing the Weir feed pumps in their own factory recently established in Montreal. Considerable new equipment has been obtained from the States and England, and the new plant is amply equipped to handle efficiently this new branch of their operations. It is announced by officials of Peacock Bros. that the Clyde Engineering Works are contemplating increased expansion of their business in Canada.

Jobs For Them.—One thousand jobs are awaiting Detroit's returned crippled soldiers at Ford Motor Company's plant in Highland Park. This announcement was made by Edsel B. Ford, president of the company. The men will be paid the minimum wage of six dollars a day of eight hours now in effect in the plant. "The thousand soldiers are wanted for our new self-starter department," said Mr. Ford. "The only requirements necessary are that they are crippled soldiers, Detroit men, and have use of their hands. Men who have lost both legs and an arm will find work with us that they can do. We can use these men whether they have to stand up or lie down at their work."

At the Polson Yards.—It is rumored that difficulties are being met with in reference to the continued operation of the Polson Iron Works, Toronto, and that if for any cause the works are closed down the completion of four boats in process of construction for the Imperial Munitions Board will be suspended. If the works are closed down 1,200 men will be thrown out of work, which, at this time, is highly undesirable. G. T. Clarkson refused to make any statement whatsoever. It is understood that the trouble became acute when the creditors failed to get together to decide upon a policy to be followed so that all concerned could co-operate in the continued operation of the plant.

Briquetting of Coal.—At a recent meeting of the Montreal branch of the Engineering Institute of Canada, a paper was read by Paul A. Seurot, M.E.I.C. on "Coal Briquetting," in which he emphasized the importance of developing this industry for the purpose of materially assisting in the solution of the ever-present fuel problem, and at the same time aid in making Canada more independent in this regard. He stated that of the total coal brought out of the mines, from 10 to 35 per cent. was practically wasted, and if proper facilities were provided the bulk of this could be economically utilized. Some little attention was given to this matter out West where some 1,100 tons of coal was briquetted per day, but when compared to other countries, Canada was far behind in the development of this industry.

TRADE IN SIBERIA

The Canadian Manufacturers' Association is sending to its members an announcement of some importance dealing with steps that have been taken to develop trade with Siberia. The circular states in part:

"Careful investigation shows clearly that wonderful opportunities await Canadian manufacturers in the markets of Siberia, provided they are taken advantage of without delay.

"The lack of financial stability in Siberia is the chief difficulty. To overcome this, the British Government has organized the Siberian Supply Co., with headquarters at Vladivostok. Honorable R. E. Hubbard, representing the British Government, spent some time in Ottawa and at the head office of the association, for the purpose of giving information regarding the possibilities of Siberian trade, and how to go about securing it.

"Through negotiations shared in by the Canadian Manufacturers' Association, the Department of Trade and Commerce, the Canadian Trade Commission and the Siberian Supply Co., the services of the latter have been placed at the disposal of Canadian manufacturers who desire to enter the Siberian export field. This organization endeavors to keep itself constantly informed as to what goods are required and in what quantities. When it finds a possible market for Canadian goods, the Canadian Trade Commission at Ottawa will act as Purchasing Agent, the Canadian manufacturers to be paid before the goods leave Canada, out of a credit to be established by the Canadian Government. We have been provided with a list compiled by responsible mercantile and Government representatives at present in Siberia, showing the classes of goods in demand and a schedule of these appended hereto.

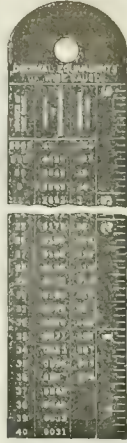
"Members of this association who are organized into groups should consider the advisability of sending group representatives immediately to Vladivostok.

"Individual manufacturers who are in a position to make prompt deliveries are urged to send catalogues (illustrated where possible), and price lists (in Canadian currency and f.o.b. shipping point), giving weight and cubic space of goods when packed for ocean shipment, as well as samples where practicable, to Honorable R. E. Hubbard, the Siberian Supply Co., Vladivostok.

"Please advise us when you forward catalogues and samples, in order that we may check their delivery, and furnish you with information in regard to transportation of goods.

"If you are interested, communicate with the Commercial Intelligence Department of this association, 1404 Bank of Hamilton building, Toronto, reporting any action taken hereon. The association will arrange for conferences with the Canadian Trade Commission at Ottawa, for any group of manufacturers in kindred lines when advice is received that such conferences are desired.

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SCALES

All standard patterns, also Combination Steel Scales and Reference Tables, carrying DECIMAL EQUIVALENTS OF FRACTIONS AND WIRE GAUGES, TAP AND DRILL SIZES OF ALL STANDARDS.

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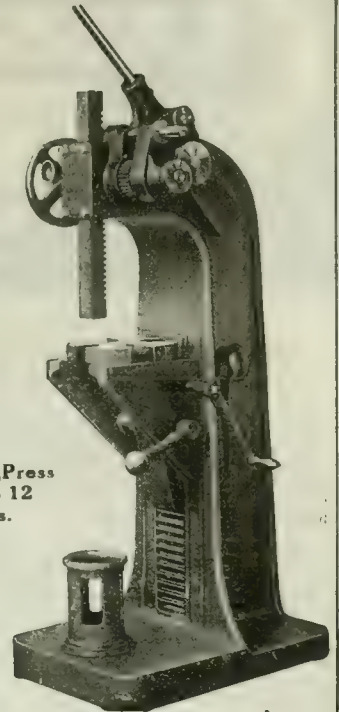
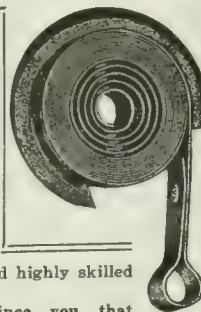
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A trial will convince you that "Barnes-Made" Springs are the best buy.

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Makers of "Barnes-made" Products
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No. 4 Press
10 to 12
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Write for complete information on
Atlas Arbor Presses. All sizes for all
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Portlights



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SECTION

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IF YOU ARE LOOKING FOR A SUPERINTENDENT or general foreman, a Canadian citizen with twenty years varied shop experience in Canada and United States, a thoroughly live man with executive ability, one that can lower the cost and raise the quality of your product, just get in touch with the advertiser. Box 566, Canadian Machinery. (c14m)

SUPERINTENDENT OR WORKS MANAGER now open for position. Sound, practical man, with good initiative and executive ability. Thirty years' experience on marine and Corliss valve engines, machine tools, mining and sawmill machinery; also general repairs. Well versed in the design of tooling required to get the maximum efficiency and production. Best references. Box 568, Canadian Machinery. (c14m)

MACHINE WORK WANTED

MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

PATTERNS

TORONTO PATTERN WORKS, 65 JARVIS Street, Toronto. Patterns in wood and metal for all kinds of machinery. (cfm)

BRANTFORD PATTERN WORKS ARE PREPARED to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell Phone 631; Machine Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (ctfm)

HELP WANTED

WANTED—A CAPABLE MACHINE TOOL salesman. State experience. Box 553, Canadian Machinery. (c14m)

WANTED—DRAUGHTSMAN FAMILIAR WITH mining and crushing machinery. State salary expected. Box 565, Canadian Machinery. (c14m)

SALESMAN—MACHINERY AND SUPPLIES— City of Montreal. Man familiar with machine tools and with experience and connection in City of Montreal preferred. Good opportunity for an ambitious and capable young man. Write in detail in first instance, stating salary wanted to start. Box 569, Canadian Machinery, Montreal. (c15m)

DRAFTSMAN WANTED
EXPERIENCED ON MACHINE TOOL DESIGN. Apply in confidence to Box 570, Canadian Machinery. (c18m)

FOR SALE

PLANER FOR SALE, 46 INCHES WIDE, 36 inches high, 17 feet bed, has single head and screw feed, in first-class condition. Will be sold cheap. Apply The John Whitfield Co., 33 Sherbourne St., Toronto. (c13m)

ONE SECOND-HAND JENCKES CORLISS EN- gine—12" x 30". Cut, description and price on application to Canadian Ingersoll-Rand Co., Limited, Toronto, Ont. (ctfm)

CANADIAN WESTINGHOUSE MOTOR. 100 h.p. Serial No. 113842, full load speed, 580 r.p.m., 225 amps. per terminal, 220 volts. Constant speed, 7200 alts. Armour & Co., Hamilton, Ont. (c14m)

ONE SPINDLE, GRIDLEY, AUTOMATIC, 7/8- inch capacity, second-hand, perfect condition, slightly used. Ontario Metal Products Company, Limited. (c15m)

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100 $\frac{1}{2}$ and 1 $\frac{1}{4}$ h.p., air cooled gas engines, in semi-finished condition, with patterns, jigs, gauges, etc. Attractive bargain to serious party. Apply to
THE A. BERNARD INDUSTRIAL CO.,
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FOR SALE

Shepard Electric Hoists, 3 Tons Capacity with Motor Driven Trolleys, Floor or Pulpit Control $\frac{220}{440}$ Volts, 3 phase, 25 cycles. Used one year, A1 condition.

N. B. PAYNE & CO.,
Electric Traveling Cranes and Hoists
Telephone, 25 Church St.,
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Canadian Patent No. 180024. Rail Bonds. Manufactured and used extensively in mines in U.S.A.

G. H. BURGE,
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MACHINERY WANTED

WANTED—ONE TWO H.P. MOTOR, 3 PHASE, 60, 220. One 10-inch lathe chuck, 4 jaw. One 16, 18 or 20 inch, 4 jaw. Northwestern Iron Works, 1419 Scarth St., Regina, Sask., Canada. (c13m)

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AGENT WANTED

By a well known Sheffield firm for tool steels and alloy steels.

Must have technical knowledge and good connection. State qualifications fully to

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For Sale

- 1—No. 40 Bliss Press.
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- 1—42" Boring Mill, two heads.
- 1—30 x 30 x 10 Planer.
- 1—16" Smith Mills Shaper.
- 1—18 x 6' C.M.C. Lathe.
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- 5—Racine Power Hack Saws.

Charles P. Archibald & Co.

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164 St. James St. - Montreal

Good Used Equipment

Shaw 7 $\frac{1}{2}$ Ton 3 Motor Crane, D.C. 220.

36" x 16' C.M.C. Triple-gear-ed Q.C. Lathe.

27" x 16' LeBlond D. B. G., Q. C. Lathe.

Pels Type Beam Shear.
Bertsch Plate Shear.

23 x 26 W. & W. Bulldozers.
2,000 cu. ft. Can. Ing. Rand Air Compressor.

96" Fifield Hor. Boring Mill.
88" x 20' Bertram D. B. G. Lathe.

The A. R. Williams Machinery
Company, Limited

HALIFAX N.S.

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LATHES.

- 14" x 6' McKENZIE, standard.
- 14" x 8' LEBLOND Toolroom Equipment.
- 14" x 7' HENDEY Toolroom Equipment.
- 6-16" x 6' C.M.C. double back gear, quick change gear.
- 18" x 6' CISCO, double back gear.
- 19" x 10' LEBLOND heavy duty.
- 22" x 10' REED PRENTICE, geared head.
- 12-26" x 12' C.M.C. double back gear, quick change.
- 28" x 10' CONRADSON geared head.
- 36" x 14' NEW HAVEN triple geared.
- 24"-40" x 20' McCABE, double spindle.
- 28"-44" x 14' BERTRAM gap lathe.
- 20" x 36" x 14' CMC gap lathe, double back gear, quick change gear.

SHAPERS.

- 15" McKENZIE B.G. crank.
- 16" RAE B.G. crank.
- 16" STEPTOE crank.
- 20" GOULD & EBERHARDT high duty.
- 24" and 28" GOULD & EBERHARDT high duty.

MILLERS.

- No. 1½ and 2½ LEBLOND Universal.
- No. 3H and 4 LEBLOND Universal.
- No. 3 FORD-SMITH Universal.
- BECKER vertical single pulley drive.
- BECKER No. 7H Lincoln type.

GRINDERS.

- No. 3 LANDIS Universal.
- No. 1 LEBLOND Universal Tool, power feed and wet attachment.

The above list merely gives part of our stock, which is ready for immediate shipment from Toronto.

Write our Service Department and put your proposition up to them.

THE A. R. WILLIAMS MACHINERY CO., LIMITED

64 FRONT ST. W.

TORONTO

GISHOLT Tool Grinder.

BAY STATE vertical surface.

DRILLS.

- 10" MYERS bench sensitive.
- 10" McKENZIE sensitive.
- 14" MYERS column sensitive.
- 14" PERFECT column sensitive.
- 15" BARNES lever feed.
- 20" BARNES back geared.
- 22" BARNES sliding head.
- 26", 28" and 34" BARNES sliding head.
- 26" and 28" BARNES with taper.

RADIALS.

- 2' FOSDICK National pattern.
- 3' NILES box table.
- 4' CINCINNATI-BICKFORD, speed box drive.
- 5' LONDON box table.
- 5' FOSDICK heavy duty speed box and tapping attachment (new).

PLANERS.

- 24" x 24" x 7' LONDON heavy pattern.
- 30" x 30" x 8' BERTRAM, one head.
- 36" x 36" x 12' BERTRAM, one head.
- 42" x 42" x 10' MCGREGOR GOURLAY, heavy pattern, 2 heads.
- 26" x 26" x 8" new WHITCOMB-BLAIS-DELL.

MISCELLANEOUS.

- 8" JARECKI pipe threading machine.
- 4" MERRILL pipe threading machine.
- 1½" MCGREGOR GOURLAY.

Used Machinery and Motors For Sale

- 2-24" Colburn Drill Presses. \$500.00 each.
- 1-24" Baker Heavy Duty Drill Press. \$450.00.
- 3-Newton Cold Saws. Cheap.
- 2-Davis Cut Off Machines. \$100.00 each.
- 2-Hamilton Gear Cut Off Machines. \$100.00 each.
- Racine No. 1 Power Hack Saws. \$65.00 each.
- Peerless Heavy Duty Power Hack Saws. \$100.00 each.
- 1-200 Gallon Dean Pump, 1,800-lb. Pressure. Cheap.
- 1-Le Blond 24" x 10' 0" Lathe with Taper attachment. \$500.00.
- 1-Bawden 6" Shell Lathe. \$150.00.
- 1-McGregor-Gourley 18" x 8" Lathe. \$200.00.
- 1-18" x 8' 0" Putnam Engine Lathe. \$150.00.

MOTORS

- 1-Canadian General Electric Co., type 1, class 6, 25 cycle, 200 H.P., 550 volts, 185 amp., 500 R.P.M., wound rotor at \$2,300.00.
- 1-Canadian Westinghouse Co., type C.C.L., induction motor, squirrel cage rotor, 300 H.P., 2,200 volts, 70 amp., 3 phase, 25 cycle, 480 R.P.M. at \$3,200.00.
- 1-Canadian General Electric Co., 200 H.P., type 1, class C, 25 cycle, 2,200 volts, 46 amp., 500 R.P.M., squirrel cage rotor at \$2,800.00.
- 1-Canadian Westinghouse Co., type C.C.L., 200 H.P., 550 volts, 189 amp., 3 phase, 480 R.P.M., 25 cycle, squirrel cage rotor at \$2,450.00.
- 1-Canadian General Electric Co., type 1, class 4, 25 cycle, 150 H.P., 550 volts, 146 amp., 750 R.P.M., squirrel cage rotor at \$1,850.00.
- 1-Canadian Westinghouse Co.'s type C.C.L., 150 H.P., 2,200 volts, 36 amp., 3 phase, 25 cycle, 480 R.P.M. at \$2,800.00.

All the above in good condition. Call or write

The Canada Metal Co., Ltd.
35 Fraser Ave. Toronto

USED MACHINERY

In stock at New Glasgow and offered for sale:

- 1 "Bullard" lathe 20x12'-0"
- 1 "Curtis" air hoist 8"x4'-0"
- 1 "Matheson" hydraulic press 14"x24"
- 1 "Sturtevant" volume blower, No. 7
- 1 "Grant" riveting hammer, belt driven (NEW)
- 1 "Berlin" hardwood flooring planer and matcher, No. 88.

Write for particulars and prices.

I. MATHESON & CO., LTD.
Builders of Machinery
New Glasgow, Nova Scotia

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Large Quantity of
USED MACHINERY
In excellent condition.

Automatic and Hand
Screw Machines
Drill Presses, Grinders
Milling Machines
Punch Presses
Electric Motors
Air Compressor
Automatic Slotting
Machine
Twist Drills
Miscellaneous Equipment

P. W. Ellis & Co., Ltd.

St. Clair Ave. and Prescott St., Toronto

We Want a Mechanical Engineer With Sales Experience

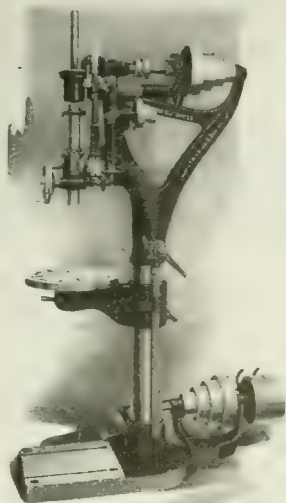
—a man who can give his entire time to selling a widely advertised power house device. An intelligent, convincing talker, a man not afraid of work, a man who expects good pay for good work, is the man we want. We will respect your confidence. In the first instance, write fully to Box 160, Power House.

P.H.

YOU'LL FIND WHAT YOU WANT

In the Classified Advertising Section of Canadian Machinery. Watch it each week for all kinds of new and used machinery.

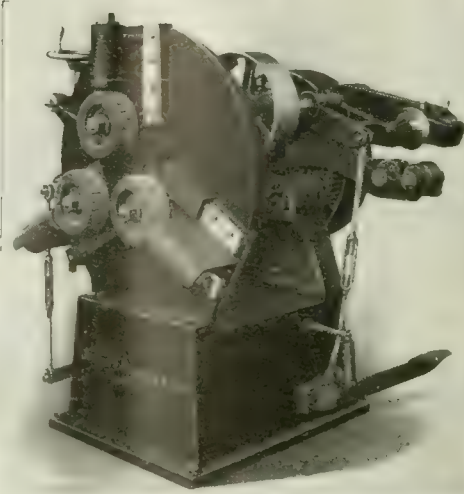
YOU MAY WANT WHAT YOU FIND.



A light type drill, having hand wheel, hand lever and automatic feed.

IF YOU WANT Machine Tools NEW OR USED

Complete equipment for
Boiler Shops, Structural
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or Machinery for any
other purpose, or Wood-
working Machinery of
any kind



A Universal Machine for cutting and cleaning from 1 1/2" to 6 1/2" flues.

GET OUR QUOTATIONS

Garlock-Walker Machinery Company, Limited

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You need special tools—we need your work. Send us your blue prints for estimates on following:

Gauges, Tools, Dies Special and Rolling Mill Machinery

High-grade workmanship and accuracy
on all work guaranteed.

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LIMITED

427 Queen St. W. - Toronto, Canada

IMMEDIATE DELIVERY

MONTREAL STOCK

Motors 3-Phase 60-Cycle

75	H.P.,	550	VOLTS,	450	R.P.M.	2
60	H.P.,	550	VOLTS,	450	R.P.M.	1

TRANSFORMERS....3

200 K.V.A., 2200/2300—14000/15000, 60 Cycles.

TRANSFORMERS, POLE TYPE—550 $\frac{220}{110}$ VOLTS

5 K.W. 2 10 K.W. 1

D.C. LIGHTING GENERATOR

10 K.W., 110 VOLTS, 450 R.P.M. 1

RAND AIR COMPRESSOR, 800 F T. 1

Prompt Delivery and Subject to Inspection.

**Low Phosphorus Pig Iron, Electric
Furnace Products, Steel Products
of all descriptions**

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Machinery and Entire Plants *Equipment of* O'Brien Munitions, Limited, and Energite Explosives

All In First Class Condition

PIPE AND FITTINGS—

Standard pipe $\frac{1}{4}$ " to 8". Boiler tubes, Standard fittings and valves, whistle, steam traps, Hydraulic Fittings (50% brass), cast iron pipe, radiation wall and floor, etc., etc.

ELECTRICAL EQUIPMENT—

Motors, Transformers, Switchboard and endless instruments, Northern Electric magneto telephone system, Fire Alarm system, Line material, poles and pole fittings, copper wire, lead cable, Wheeler street lights, etc., etc.

AUXILIARY STEAM PLANT—

Cross-compound, GouldieMcCullough Corlis Engine, 275 K.W. Generator with complete equipment, including instruments.

BOILERS AND TANKS—

100 H.P. Gouldie-McCullough, 150 H.P. Jencks Machine Co. 200 H.P. Heiner Safety Water Tube, steaks, guys, valves and fittings; water heaters, steam superheaters.

PUMPS AND COMPRESSORS—

Pumps—C.F.M. duplex, Gould and Whouse centrifugal and fittings. Compressors—Steam whouse, Ingersoll-Rand, Underwriters crowell pressure and vac.

FANS AND COILS—

Canadian Buffalo Forge ventilating and pressure fans, heating coils, exhausters, blowers, etc.

HYDRAULIC EQUIPMENT—

Accumulators, Pumps, Presses, all complete with fittings, etc.

CONVEYORS (horizontal and return)

Complete with belting, rollers, pulleys, driving gears, motors, Am. Steel & Wire Co.'s aerial cableway, cars, shields, driving mechanism and cables.

ETHER-ALCOHOL APPARATUS—

Badger's latest improved Ether and Alcohol units complete.

MIXERS—

Werner Pfiderer, self-dumping.

REFRIGERATING EQUIPMENT—

By Kroeshell Bros., steam or electricity complete, condensers, coils, headers, valves and fittings.

INDUSTRIAL RAILWAY—

Rails, frogs, switches, fish plates, turn tables, gasoline and oil locomotives, steel box cars, flat cars, work, coal, cinder, wooden powder and rat cars, and all-steel snow plough.

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100-lb. pressure 1,000 gal. Underwriters Centrifugal Fire Pump, with direct connected 100 H.P. G.E. motors; capa., six streams.

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Hot water tanks, bib taps, wash basins, toilets, showers, latrains, syphon traps, wash basins, etc.

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Howe and C.F.M. platform, Renfrew Truck, C.F.M. Tank and Truck, automatic weighing machine.

PIPE COVERING—

85%, 2-ply Magnesia, Cork Covering 4" 125'.

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Belts, shafting, pulleys, hangers, gears, conveyors, elevators, etc.

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Consisting of fully-equipped machine, carpenter, tinsmith and blacksmith shops. Also a quantity of miscellaneous machinery, tools, etc., etc.

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Renfrew, Ontario

PARTIAL LIST OF TOOLS

2—60" Bullard Vertical Boring Mills
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No. 4—B. & S. Plain Miller
1—36" x 36" x 8' Gray Planer, two heads
No. 3—Cincinnati Universal Miller
5—No. 0 Steptoe Hand Millers
13" x 5' 6" New Carroll-Jamieson Quick-Change Lathe
14" x 6' New Carroll-Jamieson Quick-Change Lathe
15" x 6' New Sidney D.B.G. Quick-Change Lathe, swing 17"
15" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 17"
17" x 8' New National Quick-Change Lathe
3—17" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 19"
17" x 10' New Sidney D.B.G. Quick-Change Lathe, swing 19"
18" x 24" New Rahn Larmon Lathe, D.B.G. Quick-Change
19" x 10' New Sidney D.B.G. Quick-Change Lathe, swing 21"
9—19" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 21"
25" x 14' New Sidney D.B.G. Quick-Change Lathe, swing 27"
33" x 14' Putnam, arranged for Motor Drive
6' Western Radial Drill
5' Bickford Single Pulley Drive Radial
100-lb. New Little Giant Hammer
50-lb. New Little Giant Belt Hammer
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30-ton Watson & Stillman Hydraulic Press

FRANK TOOMEY INC.

127 North Third Street

PHILADELPHIA,

We are looking for a Canadian concern to manufacture our line.

We would like to correspond with a prominent concern in Canada with a view to having our line of machinery manufactured and sold in Canada for the Canadian market. Our line consists of excavating machinery, trenching machines, concrete mixers and concrete road-making machinery, multipedal farm tractors, etc.

Please write us as to your facilities.

F. C. AUSTIN COMPANY, INC.

Office 609 Railway Exchange

CHICAGO, ILL.

BECKER BELT-DRIVEN MILLERS -
The Machines that Give the Smooth Finish

BECKER

Where there's a Becker there's Speed

Convenience, rigidity and accuracy are outstanding features of this small size Becker Milling Machine. Use it for high speed demanding the utmost accuracy.

QUICK DELIVERIES

Becker small size Millers are carried in stock ready to ship. They include Nos. 2, 2A, 3, 4B, 2H, 3H. These machines are finely adapted for light engraving, die sinking, profiling and milling small and medium size parts.

Remember, the full Becker line includes machines for practically every milling purpose.

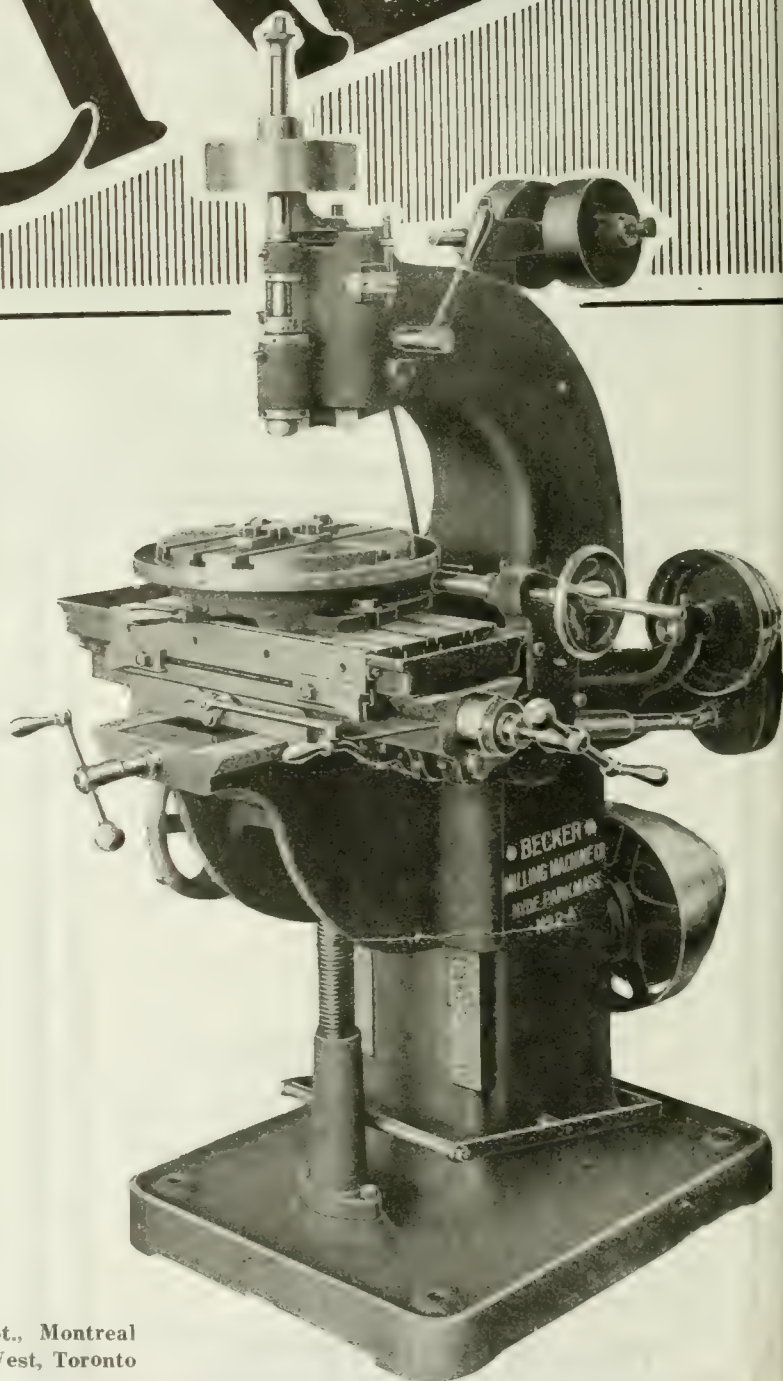
Send for Monthly Stock List.

Becker Milling Machine Company

Hyde Park, Boston, Mass.

Canadian Agents:

Rudel-Belnap Machinery Company, Ltd., 137 McGill St., Montreal
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Special Machinery, Jigs, Fixtures, Punches and Dies, Small Tools, Screw Machine Products, Gauges, Forgings, Etc.

CONTRACT WORK

**ELLIOTT & WHITEHALL
MACHINE & TOOL CO.**
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**SPECIAL MACHINERY
JIGS AND FIXTURES PUMPS
GAUGES GASOLINE ENGINES
GEAR CUTTING**

ALL EQUIPMENT REQUIRED FOR RAPID AND ECONOMICAL
PRODUCTION OF INTERCHANGEABLE PARTS. PROMPT
ATTENTION TO ALL WORK.

IN STOCK HERE

National High Speed Side Milling Cutters

6 Only	3 1/2 x 5/8 x 1"	4 Only	5 x 1 x 1 1/4"
6 "	4 x 1/2 x 1"	2 "	6 x 1 x 1"
2 "	4 x 5/8 x 1"	4 "	6 x 1 x 1 1/4"
2 "	4 x 3/4 x 1 1/4"		

National High Speed Slitting Saws

9 Only	2 1/2 x 3 6/4 x 7/8	4 Only	5 x 3 3/2 x 1
10 "	3 x 1 8 x 1	1 "	6 x 1/8 x 1
20 "	4 x 1/8 x 1	4 "	6 x 3/32 x 1
12 "	4 x 1 16 x 1	12 "	6 x 3/16 x 1
6 "	4 x 3/16 x 1	6 "	6 x 3/16 x 1 1/4
6 "	4 x 5 32 x 1	2 "	7 x 1/8 x 1
20 "	4 x 3 32 x 1		

J. A. M. Taylor MACHINE SHOP
M. 786 318 Stair Bldg., Toronto SUPPLIES

FITCHBURG

**Plain Cylindrical
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Built by
Fitchburg Grinding Machine Co.
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Manufacturers of UNIVERSAL CYLINDER
RE-BORING TOOLS.

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Windsor, Ont.

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The REGO 100% Efficient Welding Torch

• Saves Oxygen Eliminates Flash-Back Better Welding

Write to us for anything and everything you need.

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**BATH Universal
Manufacturing Grinders**

built by
**Universal Grinding Machine
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Built to Order

Also gauges, punches, jigs, dies, small tools, etc.

Prompt Service.
Moderate cost.
Send Blueprints for estimate.

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MADE IN
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CANADA

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MACHINE CO. HAMILTON, ONT.
ACCURACY-RELIABILITY

ACCURATE **TOOLS**

**MACHINES, EQUIPMENT
APPLIANCES and TOOLS**
for
SPECIAL PURPOSES
DESIGNED AND BUILT

We will make what YOU want
as you want it.

Write us about it.

WOOD METAL PATTERNS
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OUR REGULAR PRODUCTS:
THREAD GAUGES
SNAP GAUGES
CYLINDRICAL GAUGES

**WE ARE GENERAL AND
SPECIAL TOOL MAKERS**

Let us quote you on your require-
ments, and have your tools made
as you want them made.

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TRADE MARK
WENTWORTH



**SPECIALISTS
IN
BRONZE
BRASS
GUNMETAL
AND
ALUMINUM**

**WENTWORTH MFG. CO.
LIMITED
HAMILTON - CANADA**

WENTWORTH
DEPENDABLE
CASTINGS

**Special
Equipment**

Built to
Specification

Steel Plate
and Structural
Steel Work

Grey Iron Castings

High Quality
and
Prompt Service
Double-Sure

Write for
Full Particulars

WILLIAM HAMILTON CO., Limited
TORONTO - ONTARIO

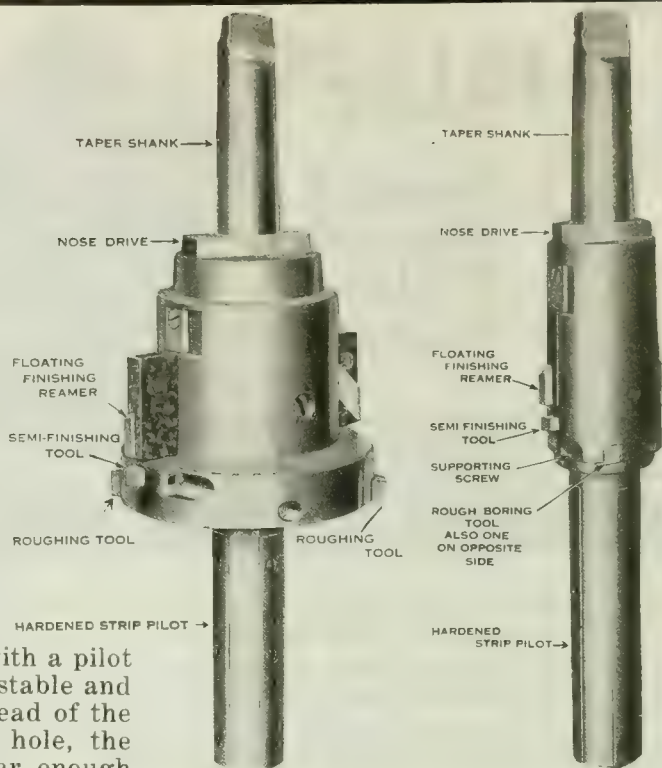
KELLY

Tools for Bigger PRODUCTION

Use These Cost Cutting Combinations

This photograph was taken in the plant of the Youmans Machine Company, Cleveland. The drill press is a standard type; work is performed at two settings.

For the larger hole, the Kelly Tool is fitted with a pilot that enters the fixture guide hole. Two adjustable and replaceable high-speed steel tools are set ahead of the floating reamer; the first rough bores the hole, the second semi-finishes and the reamer (set far enough back to allow the boring tools to clear) finishes it, all in one pass of the spindle.



At the second setting, the fixture is provided with a locating plug that fits the larger hole. The tool is similar to the larger one and performs practically the same work, except that the hole is longer and the boring tools do not clear before the reamer enters. Both holes are held to a limit of .001"; center distance to .002". Holes must be parallel to each other and square to the face. This work is performed on steel castings and is of such uniformly high standard that it passes the most careful inspection. Kelly Tools for drill press work are provided with pilots and bodies of any specified diameter and length, with shanks to fit taper hole in spindle or adapted to use special chucks.

Catalog J-4 shows Kelly Tools in action. Get it?

**THE KELLY
REAMER CO.
CLEVELAND, OHIO**

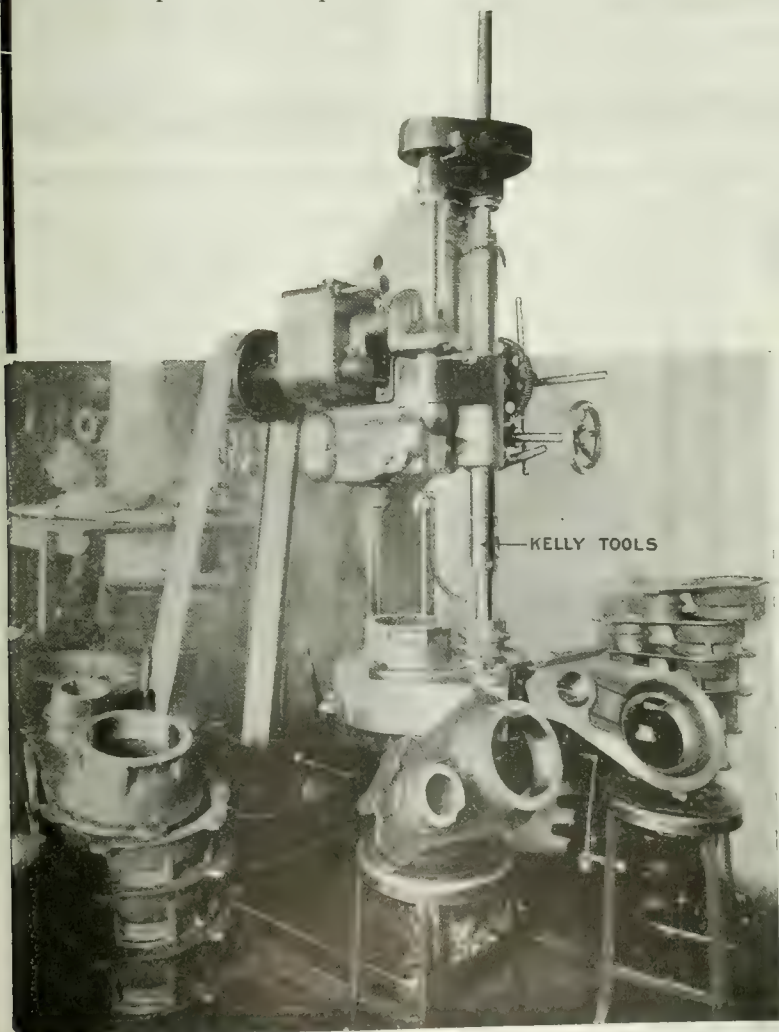
AGENTS:

London: Burton, Griffiths & Co., Ltd.

Paris: Burton Fils.

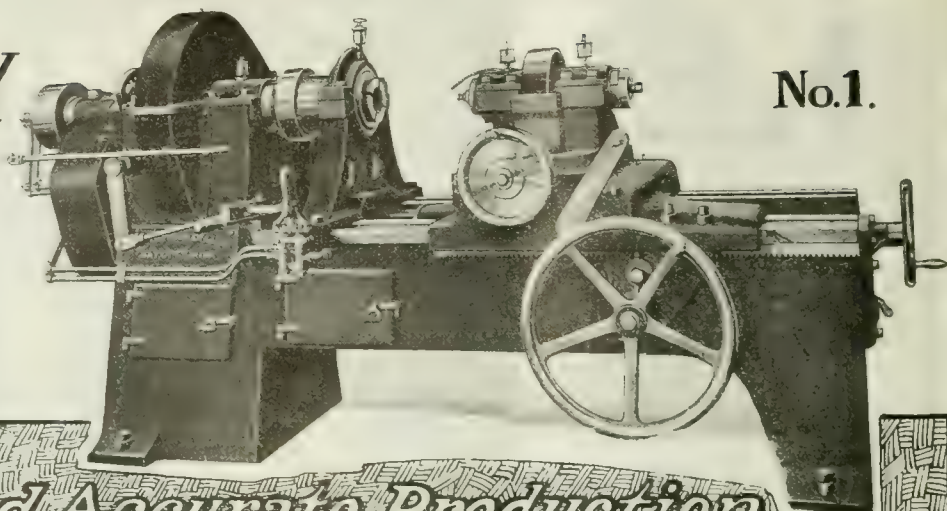
Latin America: Fox Bros. & Co., New York City.

40 Domestic Agencies.



S MALLEY

General
Thread
Milling
Machine



No.1.

For Fast and Accurate Production

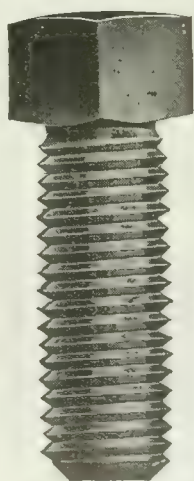
Investment in labor-saving devices is not an expense. The real expense is the constant daily leak through the pay roll. The **Smalley General Thread Miller** is the great economizer of human effort. Its accuracy, its convenience and speed

justify the investment of capital necessary to its installation wherever quantity thread milling is done. This modern machine tool has two speeds and will mill in one minute 2 to 12 inches, or turn 15 to 30 feet. Pay you to write for full description of this cost-cutter.

Smalley-General Company, Inc., Bay City, Mich.

Canadian Agents: Rudel-Belnap Co., Limited, Montreal and Toronto

ACCURACY



When you want Cap and Set Screws and Semi-finished or Finished Hexagon Nuts for your rush jobs send your order to us. Prompt service with accurate goods.

THE
GALT MACHINE SCREW CO.,
GALT, ONTARIO LIMITED

Eastern Representatives: The Canadian B. K. Merton Company
Limited, 49 Common St., Montreal, Que.

THE IMPROVED TAYLOR-NEWBOLD



INSERTED TOOTH COLD SAW
WRITE FOR BULLETIN T-S

Tabor Mfg. Co., Philadelphia, U.S.A.

SPECIAL TOOLS

Automatic Machinery
for all purposes

Punch Press Work

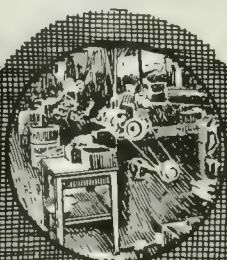
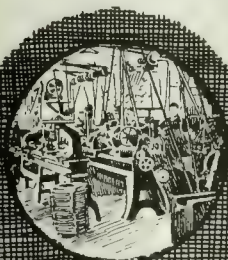
Screw Machine Products

Consult us on your machine problems

Toronto Tool Company

516 Richmond St. West

Phone Adel 1181



Don't Wear Out Men Wear Out Tools

It's cheaper to scrap dull files than to pay men to work with them.

That's why you should instruct all men to turn in files the moment they reach their "inefficient point".

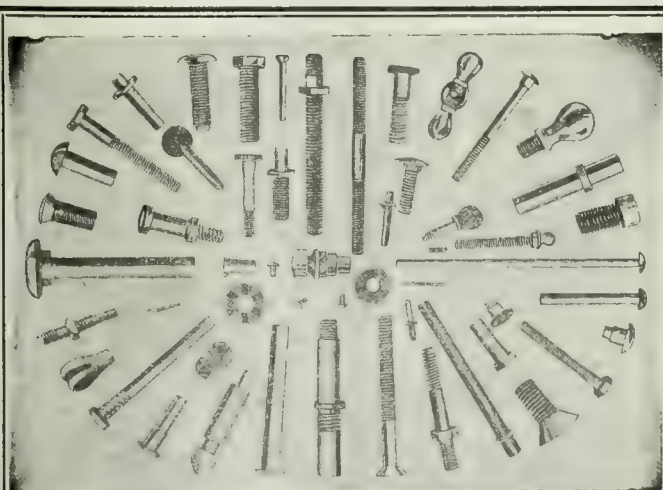
"Famous Five" Files, however, stay sharp for a long time because the steel is high grade, accurately cut and properly hardened.

Specify them when ordering.

They are :

**KEARNEY & FOOT
GREAT WESTERN
AMERICAN
ARCADE
GLOBE**

Made in Canada by



Automatic Screw Machine

ACCURACY **Products** QUALITY

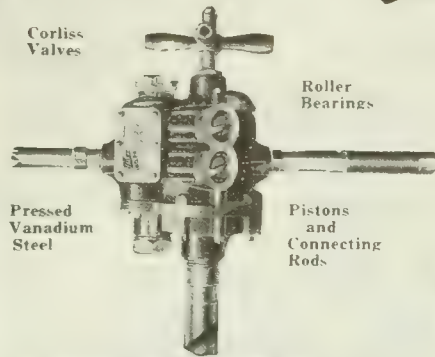
Our Mechanical Engineers are
at the service of our Clients.

United Brass & Lead, Limited

St. Helen's Avenue, - Toronto

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PNEUMATIC**Piston Air Drills
and Reamers**

Four cylinder type, two on each side. Semi-Corliss valve close to each pair of cylinders gives greater efficiency and power, saves clearance losses and allows air to enter cylinders at full pressure of the pipe line.

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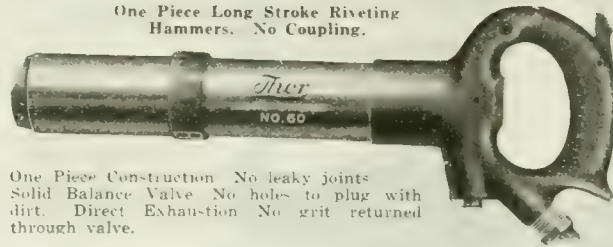
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Chipping, Calking and
Flue Beading Hammers



**SPEED UP YOUR PRODUCTION
AND BE PREPARED
FOR THE COMING BOOM**

One Piece Long Stroke Riveting
Hammers. No Coupling.



One Piece Construction. No leaky joints.
Solid Balance Valve. No holes to plug with
dirt. Direct Exhaustion. No grit returned
through valve.

Four sizes, 1" to
4" stroke. The
barrel and all
wearing parts are
hardened and
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W. D. Anderson's Engineering Efficiency Service

Manufacturers often spend thousands of dollars on additional buildings and equipment in order to get greater output and profits long before their product reaches 80 per cent., or their profits 50 per cent. of what may be easily secured from the facilities they already have.

Are you satisfied with your output? We can and will increase your production.

Ring up Anderson's Efficiency Service
PHONE 221 ADELAIDE
380 Queen West Toronto, Canada

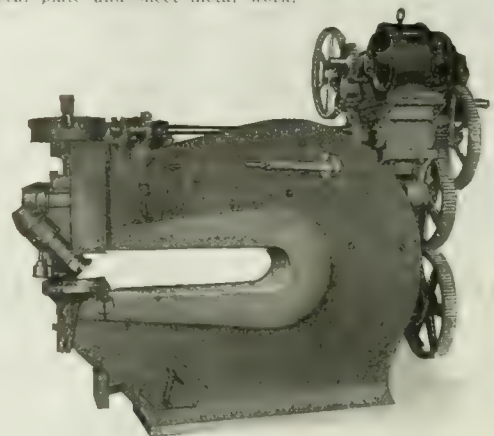
H. COLLIER SMITH
"QUICKWORK"

Registered U.S. Patent Office

ROTARY SHEARS

Made in 6 Sizes

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings without cutting in from side of sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.



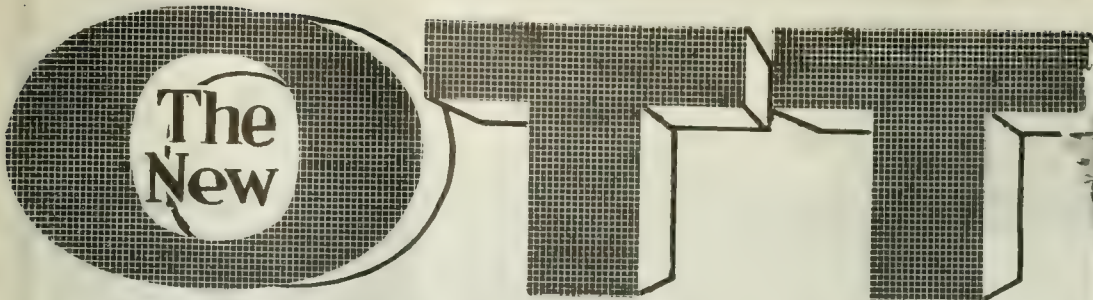
Patented Jan. 10, 1914

SAVES 50% TO 90%

Eliminates Oxyacetylene Cutting and Plate Planing

Write for Catalogue

THE QUICKWORK COMPANY, ST. MARYS, OHIO, U. S. A.

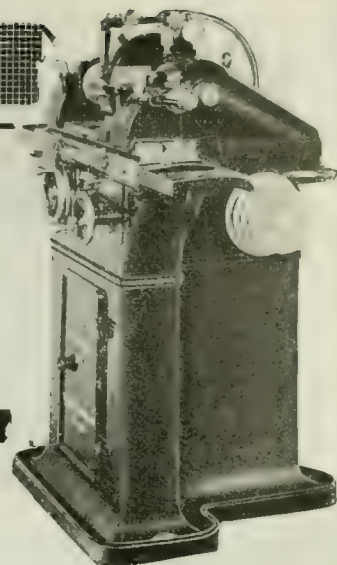
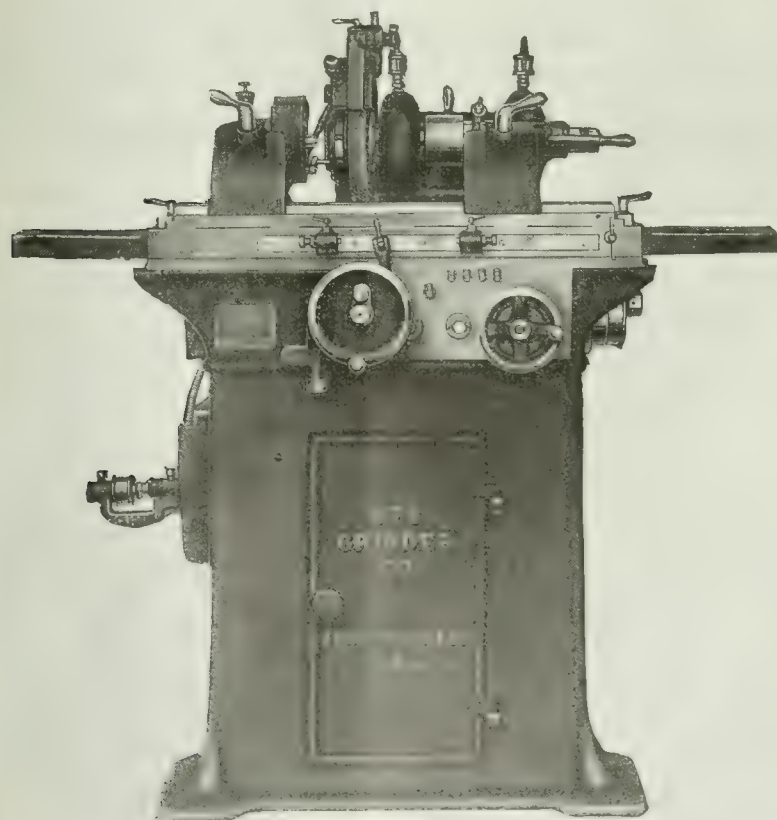


The
New

5" x 18" Plain Grinder

A TOOL of large production capacity for the grinding of duplicate parts at low unit costs.

It is of simple balanced design, permitting rapid and easy operation. It is absolutely rigid and wonderfully accurate.

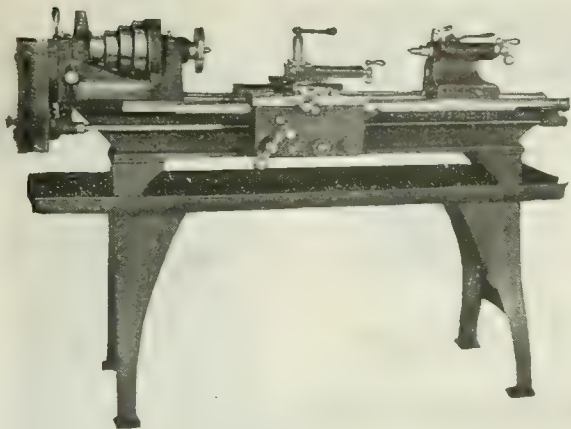


THE new 5" x 18" Plain Ott Grinder is equipped with either automatic or hand feeds. Bearings throughout are Non-Gran metal, insuring long life and the maximum of bearing service. The wheel spindle is of special steel, carefully hardened and accurately ground. It runs in bearings that can be easily and quickly adjusted for the slight wear that takes place. Spindle and bearings are constantly lubricated from two large sight-feeding oilers which enables the operator to tell at all times that the spindle is being properly lubricated. The head and footstocks clamp to the table with T bolts and align themselves from a true surface on the front edge of the swivel table. The countershaft bearings are all Hyatt Rollers.

Investigate. Send blueprints and samples of work and we will submit production and cost estimates for your consideration.

OTT GRINDER COMPANY

Main Office and Works: 217 West Tenth St., INDIANAPOLIS, INDIANA



9'-11'-13" swing with
a full line of
attachments.



35 YEARS OF PERFECTION IN SMALL LATHES

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THE SENECA FALLS MFG. CO., INC., 366 W. Fall St., Seneca Falls, N.Y.



The ideal
equipment for Accu-
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Repair Shops, Garages, Training
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GALT - ONT.

Fifteen Tons per Day

Do Your Castings Cost Too Much?

A rearrangement of your patterns might cut their cost 25%; a different method of molding them might double your production at no increase in molding cost. We can advise you and we have expert metal and wood pattern-makers who are able to make any changes that may commend themselves to you.

If you need some new Patterns

send us a sample, blueprint or sketch, and ask for our advice. It won't cost you anything. If our advice is good and commends itself to you, it is only fair to assume that our work will be equally satisfactory, and we need the work as badly as you need the patterns.

We are in a position to do turning, boring, drilling or other semi-finishing operations on castings supplied by us.

—ASK US

MAKE NAILS! NOT NOISE!

We offer the trade new types of

WIRE NAIL MACHINES

QUIET IN OPERATION; WITH VERY HIGH OUTPUT; ALL PARTS ACCESSIBLE; DECREASED MAINTENANCE COSTS; GREAT CAPACITY; OCCUPYING SMALL FLOOR SPACE.

Smoothly running machines, with balanced mechanical motions and no rotating cams. Built in 5 sizes, handling wire from No. 17 to $\frac{3}{8}$ " diam.

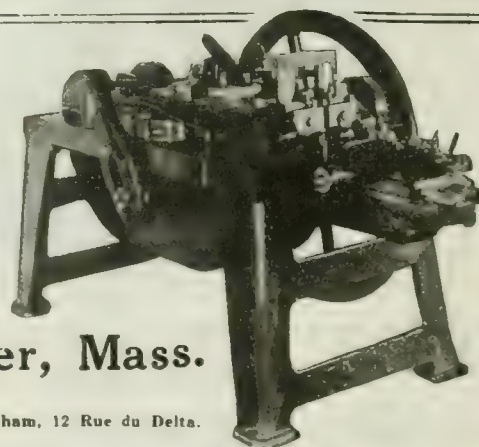
PRACTICALLY NOISELESS IN OPERATION

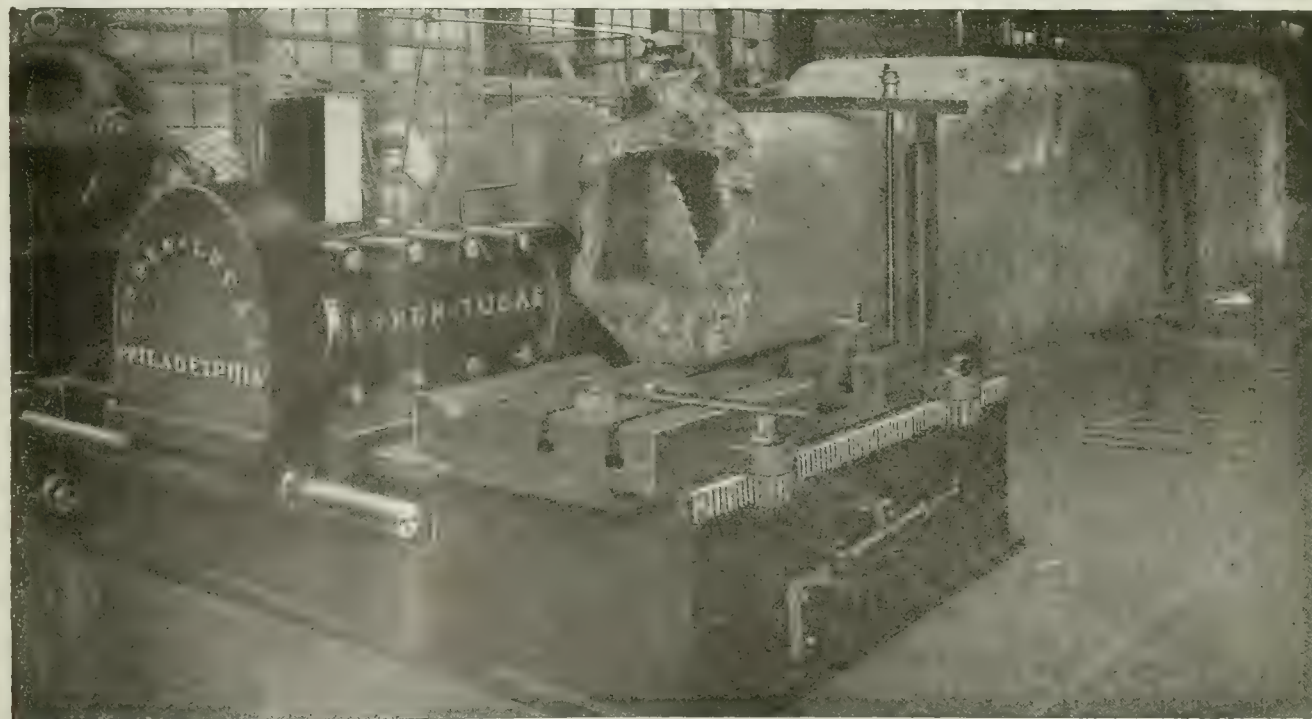
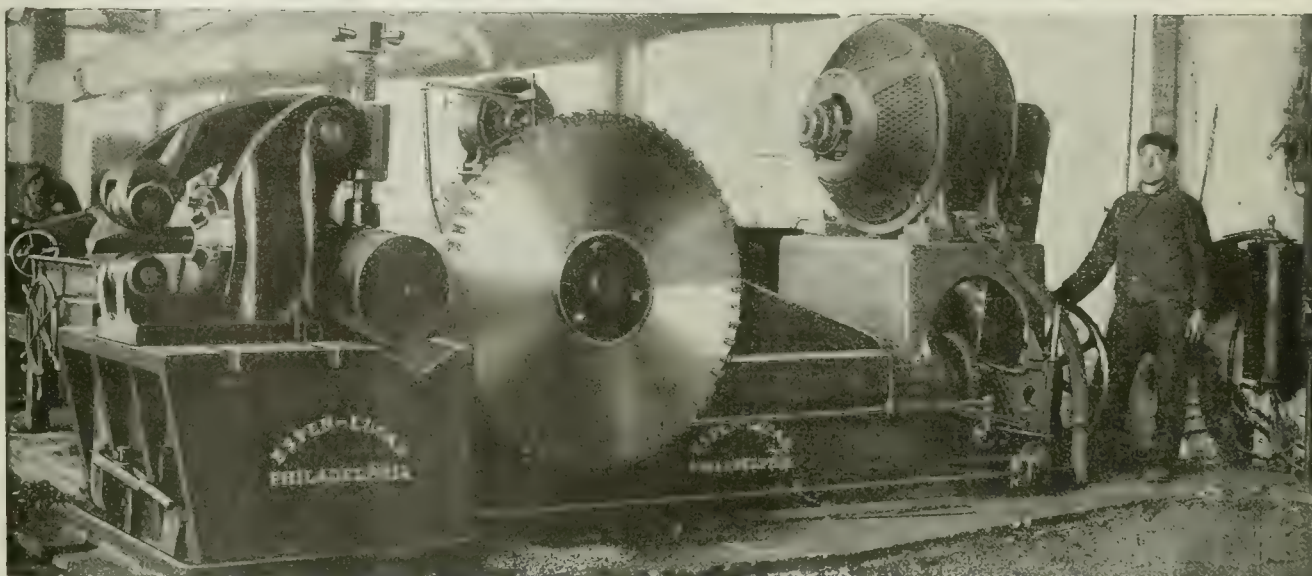
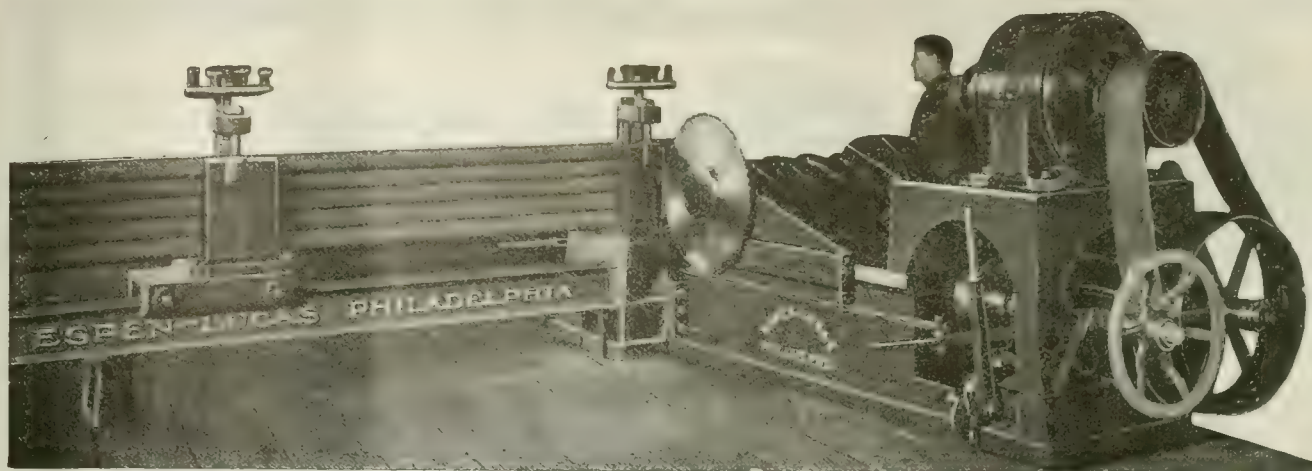
Sleeper & Hartley, Inc., Worcester, Mass.

CANADIAN BRANCH, COATICOOK, P.Q.

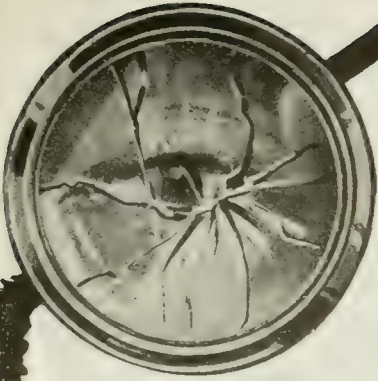
London, England, P. A. Perry, 63 Queen Victoria Street, E.C. 4. Paris, France, Edgar Bloxham, 12 Rue du Delta.

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"CELOGLAS" SHATTER-PROOF LENS

SAFETY GOGGLES

ANY glass goggle lens will break under a sufficiently hard blow. The wearer and his employer are primarily interested in what happens when the lens breaks—whether the splinters are driven into the eyes of the wearer or stay in the frame.

That's where the *Stoco* Celoglas shatter-proof lens saves the day. Even though it may be fractured by a flying missile, the lens will remain intact in the frame and no particles of glass can fly in the eyes.

Stoco Safety goggle frames with Celoglas lenses are the ideal eye protection. The *Stoco* frame is the strongest ever made for eye protection purposes. It protects around and between the eyes, and is so sturdily constructed that it will ward off any ordinary missile without inconvenience to the wearer. Light in weight and extremely comfortable in use. Lenses may be changed without the aid of special tools.

Made with easy cable ear-bows, as illustrated, or elastic headbands, at the same price.

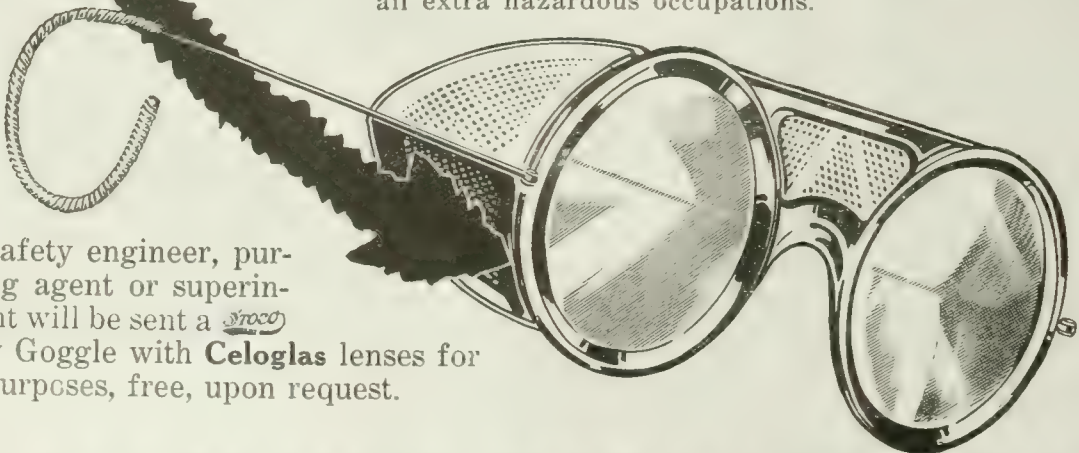
Price with CELOGLAS shatter-proof lenses,

\$115.00 per hundred pairs

Price with regular heavyweight glass lenses,

\$90.00 per hundred pairs

Stoco Celoglas lenses are earnestly recommended for all extra hazardous occupations.



Any safety engineer, purchasing agent or superintendent will be sent a *Stoco* Safety Goggle with Celoglas lenses for trial purposes, free, upon request.

STANDARD OPTICAL CO.

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THE CARTER WELDING COMPANY OF TORONTO, LIMITED, announce that in addition to their OXY-ACETYLENE WELDING and CUTTING DEPARTMENT they have added ELECTRICAL WELDING MACHINES, and THERMIT WELDING EQUIPMENT.

They are now equipped to handle everything in Oxy-Acetylene, Electrical and Thermit work. No job too small, and none too large.



THE CARTER WELDING COMPANY OF TORONTO, LIMITED, are the sole Canadian agents for the DAVIS-BOURNONVILLE Welding and Cutting Apparatus, and handle—

Portable Generators
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Welding Torches
Cutting Torches
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Carbide
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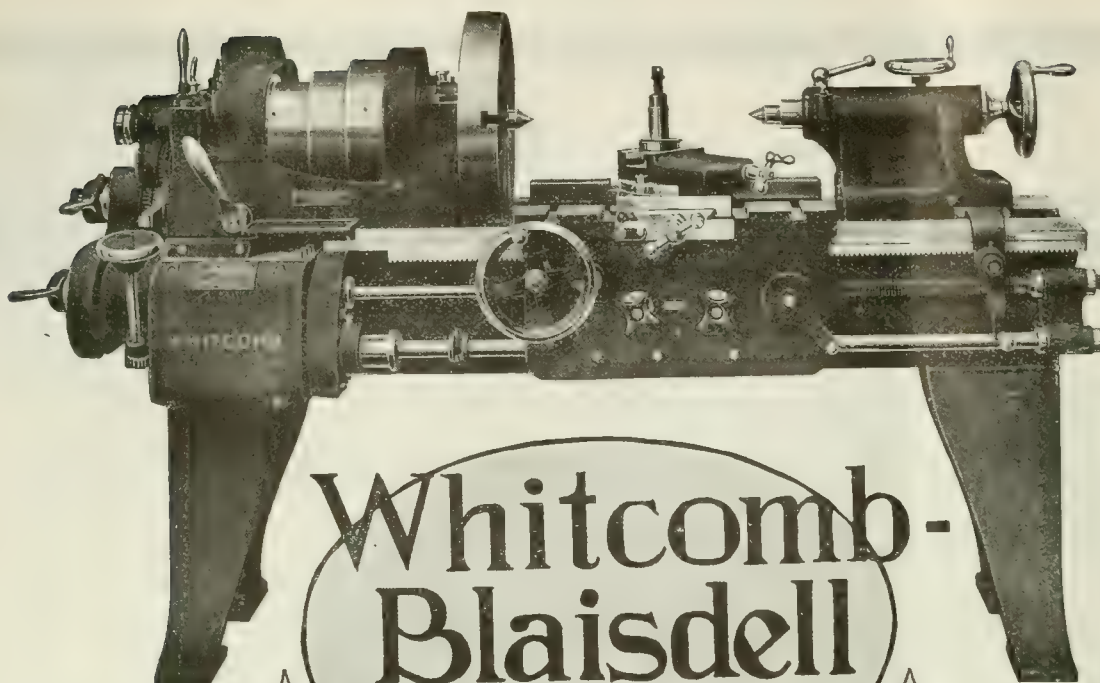
Carbon Removers
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Compressed Acetylene
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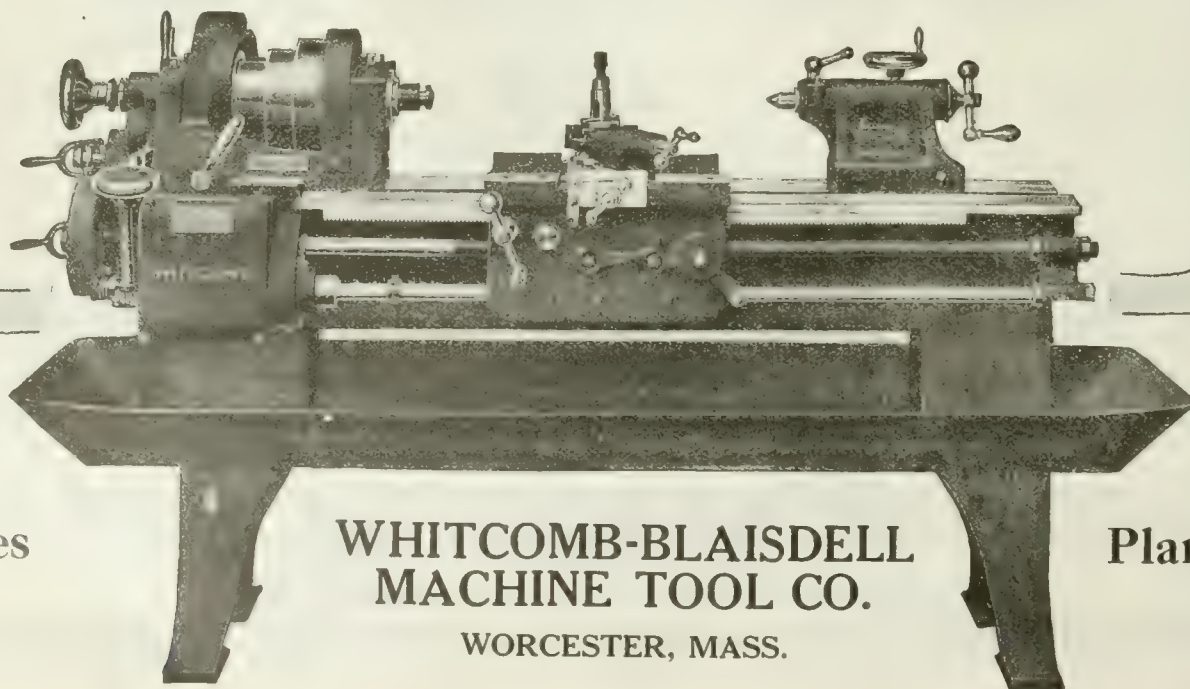
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POWERFUL, WELL-BALANCED MACHINES THAT ARE LIGHT-RUNNING AND ADAPTED TO ALL CLASSES OF RAPID MANUFACTURING.

Every feature of the W-B Lathe of to-day has been considered from the viewpoint of greatest utility. Materials used embody toughness and durability. Our tests must prove great wearing quality and strength before any material is selected.

The product of an organization that has for sixty years been distinguished for the superior design, workmanship and material of its product.

WRITE FOR OUR LATEST CATALOG DESCRIBING ALL OF THE GOOD FEATURES OF WHITCOMB-BLAISDELL LATHES.



Lathes

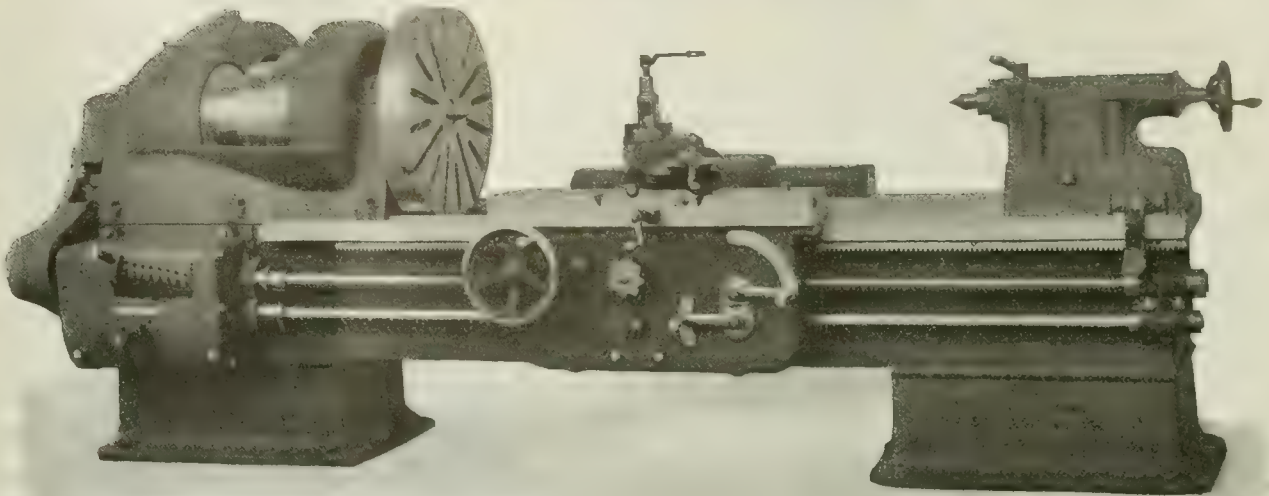
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24" x 12" (equal to most 30")

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The Lathe of Simplified Accuracy.

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Engine and Tool Room Lathes

CINCINNATI, U.S.A.

Made in

Cone Driven

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Geared Head

Motor Driven Geared Head

Becoming a Bigger Man

WHAT is the difference between some men you know and others known to you? Why are some men earning \$3,000 a year and some \$30,000? You can't put it down to heredity or better early opportunities, or even better education. What, then, is the explanation of the stagnation of some men and the elevation and progress of others?

We are reminded of a story. A railroad man, born in Canada, was revisiting his home town on the St. Lawrence River. He wandered up to a group of old-timers who sat in the sun basking in blissful idleness. "Charlie," said one of the old men, "they tell me you are getting \$20,000 a year," "Something like that," said Charlie. "Well, all I've got to say, Charlie, is that you're not worth it."

A salary of \$20,000 a year to these do-nothing men was incredible. Not one of the group had ever made as much as \$2,000 a year, and each man in the company felt that he was a mighty good man.

Charlie had left the old home town when he was a lad. He had got into the mill of bigger things. He developed to be a good man, a better man, the best man for certain work. His specialized education, joined to his own energy and labor sent him up, up, up. To put it in another way: Charlie had always more to sell, and the world wanted his merchandise—brain, skill and ability. Having more to sell all the time, he got more pay all the time.

Charlie could have stayed in the old home town; could have stagnated like others; could have been content with common wages. In short, Charlie could have stayed with the common crowd at the foot of the ladder. But Charlie improved himself and pushed himself, and this type of man the Goddess of Fortune likes to take by the hand and lead onward and upward. Almost any man can climb higher if he really wants to try. None but himself will hold him back. As a matter of fact,

the world applauds and helps those who try to climb the ladder that reaches towards the stars.

The bank manager in an obscure branch in a village can get out of that bank surely and swiftly, if he makes it clear to his superiors that he is ready for larger service and a larger sphere. The humble retailer can burst the walls of his small store, just as Timothy Eaton did, if he gets the right idea and follows it. It is not a matter of brain or education so much as of purpose joined to energy and labor. The salesman or manager or bookkeeper or secretary can lift himself to a higher plane of service and rewards if he prepares himself diligently for larger work and pay. The small manufacturer, the company director, the broker—all can become enlarged in the nature of their enterprise and in the amount of their income—by resolutely setting themselves about the task of growing to be bigger-minded men.

Specialized information is the great idea. This is what the world pays handsomely for. And to acquire specialized information is really a simple matter, calling for the purposeful and faithful use of time. This chiefly.

One does not have to stop his ordinary work, or go to a university, or to any school. One can acquire the specialized information in the margin of time which is his own—in the after-hours of business. Which means: If a man will read the right kind of books or publications, and make himself a serious student at home, in his hours—the evening hours or the early morning hours—he can climb to heights of position and pay that will dazzle the inert comrades of his youth or day's work.

IF business—BUSINESS—is your chosen field of work, we counsel you to read each week **THE FINANCIAL POST**. It will stimulate you mentally. It will challenge you to further studious effort. It will give you glimpses into the world of endeavor occupied by the captains of industry and finance. With the guidance of the POST, and with its wealth of specialized information, you, a purposeful man, aiming to go higher in life and pay, will find yourself becoming enlarged in knowledge and ambition, and will be acquiring the bases and facts of knowledge which become the rungs of the ladder you climb by.

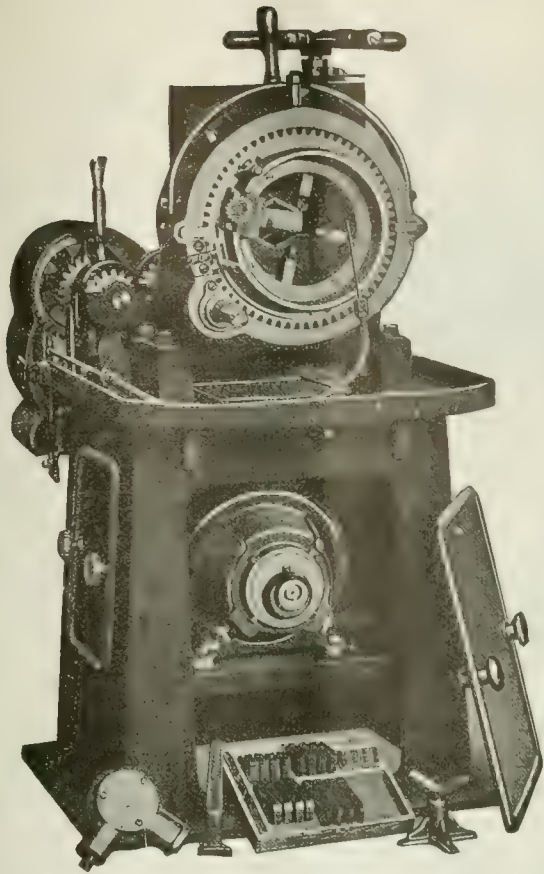
It is the first step which costs. But this cost is trivial—a single dollar. We offer you the POST for four months for a dollar. Surely it is worth a dollar to discover how right we are in our argument. If you have the will to go higher in position and pay, sign the coupon below.

THE MACLEAN PUBLISHING COMPANY, LIMITED,
—143-153 University Avenue, Toronto.

Send me me THE FINANCIAL POST for four months for one dollar.

Money to be enclosed
remitted

Signed



“Forbes Facts”

1. One man can do the work of six against the old stock and die method of cutting.
2. It is the only machine on the market with receding gear.
3. It is self-contained and motor-driven.
4. It is portable.

These are convincing arguments for the construction and utility of this machine. Thread cutting can be performed fast, clean and true. Equipped with self-centering vise.

The Curtis & Curtis Co.

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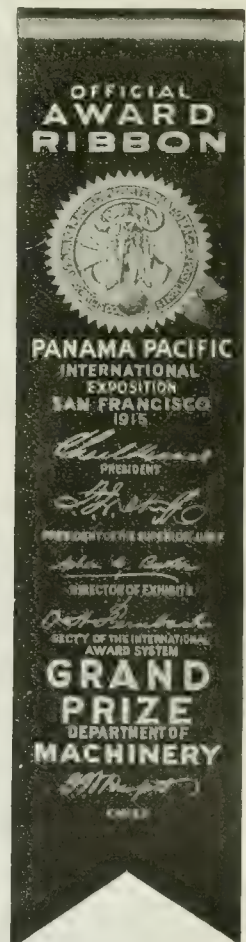
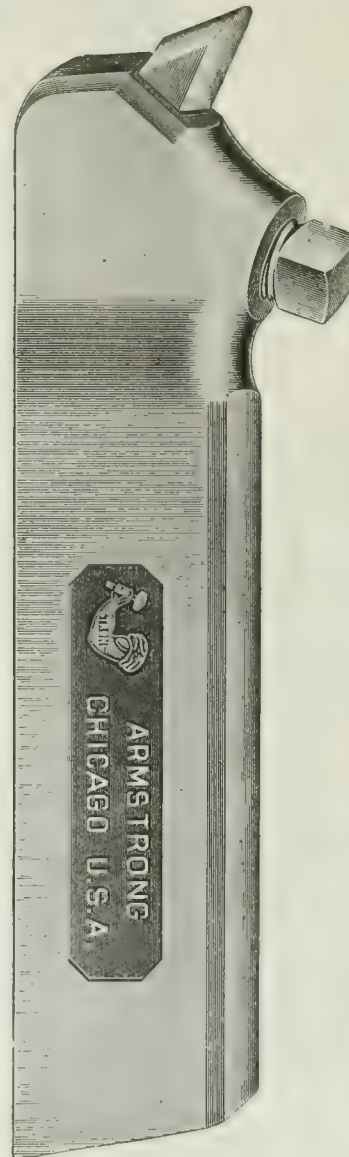
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HIGHEST AWARD

at 4 World's Expositions

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THEY ALWAYS
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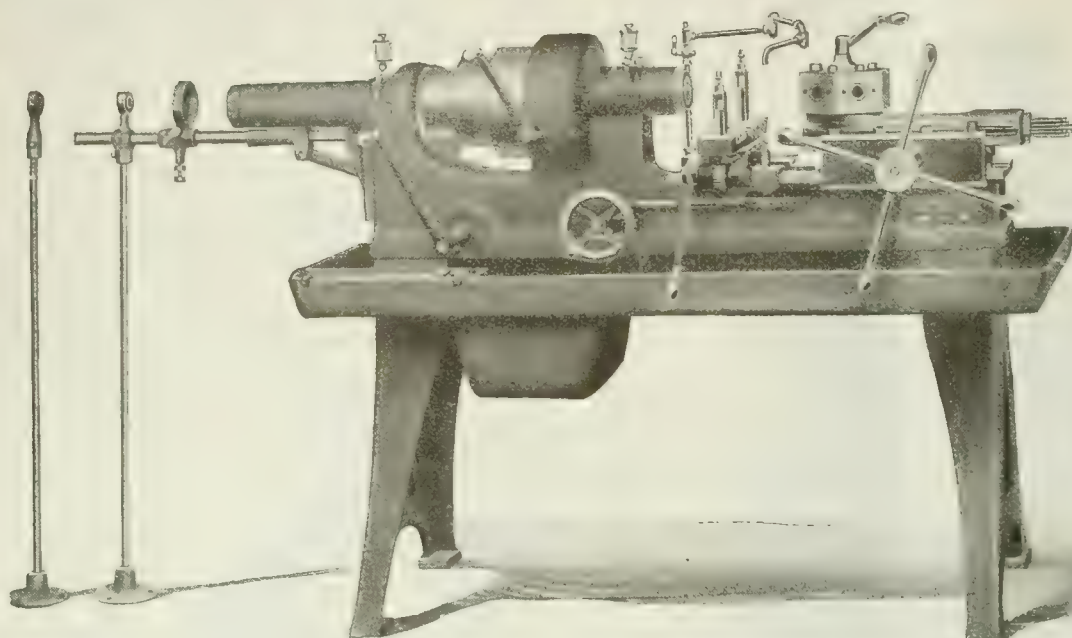


Armstrong Bros. Tool Co.

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The Panama-Pacific MEDAL OF HONOR was also won by
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The No. 2 Turret Screw Machine is particularly fitted to small parts manufacturing. Many fuse parts and adapter contractors have used large batteries with marked success. Now you will find them just as profitable and reliable for your peace work.

The machine is built with both plain head and geared friction head construction. The geared friction head adapts it particularly to threaded work up to the capacity of 1 in. x 6-in. for alloy steels and other tough metals requiring the power obtainable through this construction.

With our increased output we can quickly equip you, and, as with all W. & S. machines your production can be speeded by equipping from our immense stock of standard tools.

Turret Lathes and Screw Machines from $\frac{5}{8}$ in. x 4 in. to $4\frac{1}{2}$ in. x 44 in. bar capacity. Maximum swing $21\frac{1}{2}$ in.

THE WARNER & SWASEY COMPANY
CLEVELAND, OHIO, U.S.A.

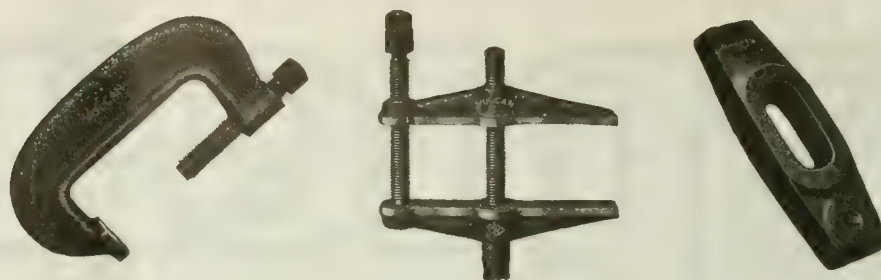
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"THEY STAND THE STRAIN"

JUST "because they're cheap" is no reason why you should buy *cast* Clamps. They're dear at any price if not dependable and a moment's thought will show that a cast product *cannot* be dependable for such service.

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**Patent Cutting-off and
Centering Machines**

TO say that the Hurlbut, Rogers Cutting-Off and Centering Machine will **double your production** and **cut your costs in half** may seem like a broad claim. But this is just what this machine will do compared with any ordinary machine of its kind.

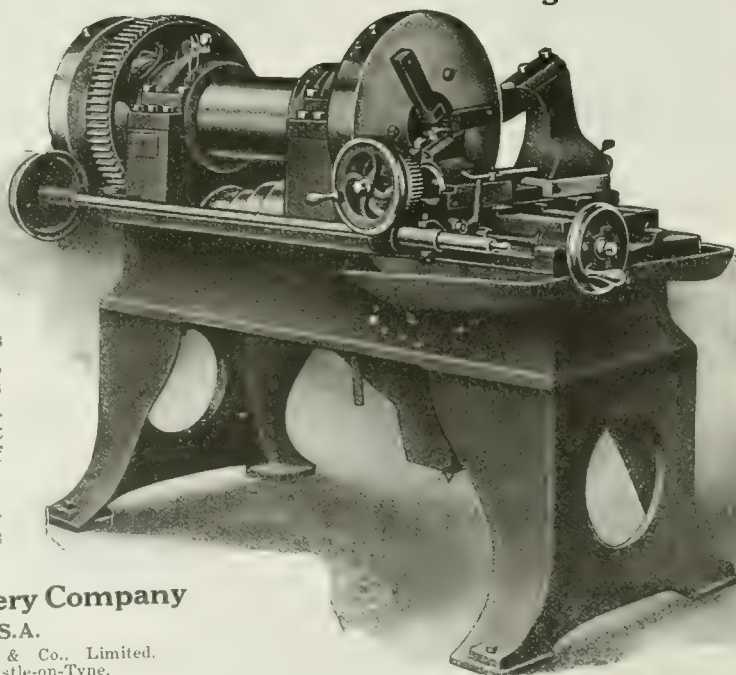
Hurlbut, Rogers speed and efficiency is easily explained. Instead of only one, it is equipped with two cutting-off tools—one cutting up and the other down. In this way they hold the work against each other and finish a job in just half the time and do twice the work.

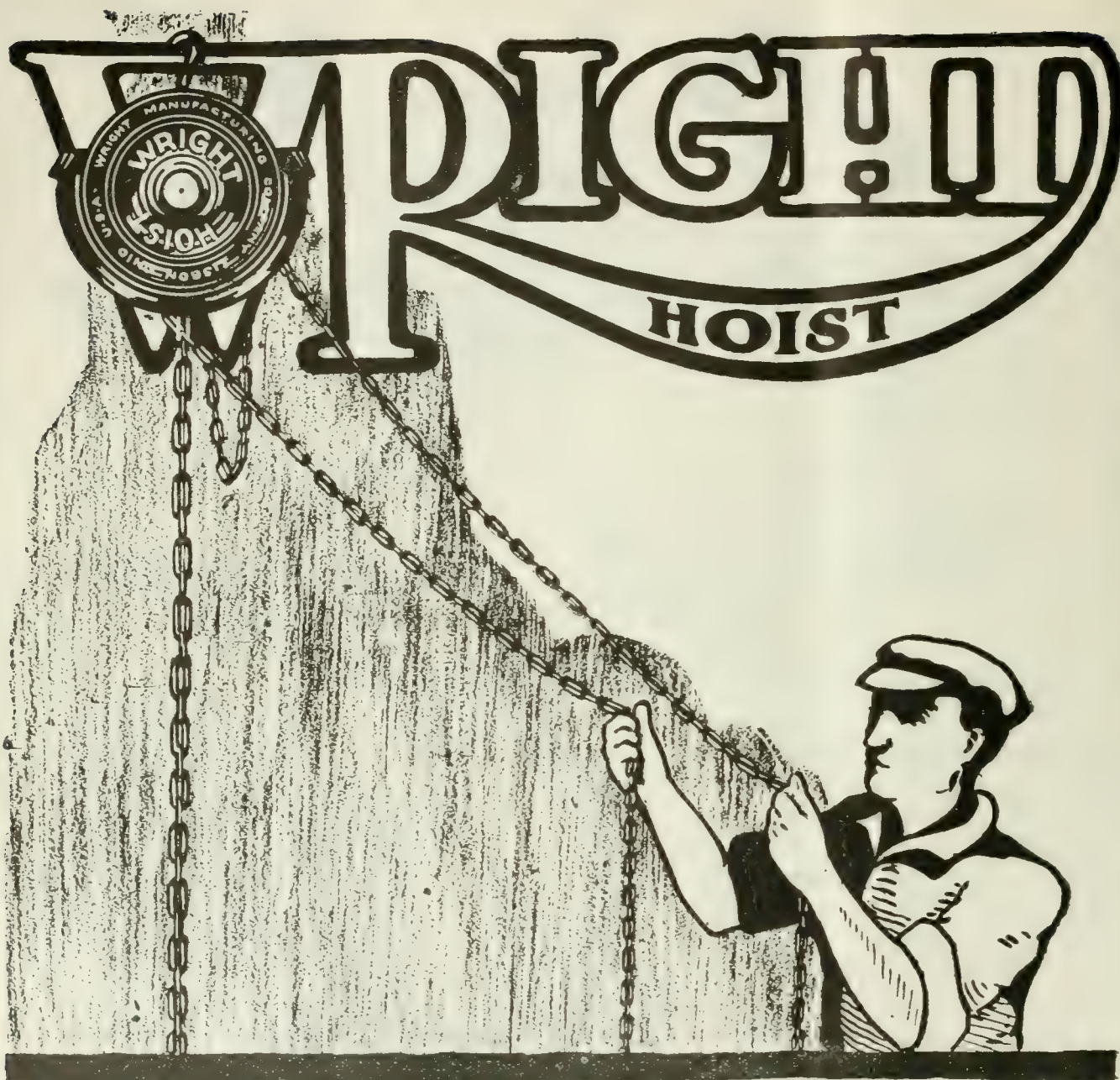
You can't afford to be without this machine. It saves real money. Let us tell you more about it. Write!

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Let us tell you cost of a Wright Hoist for your work and show you how it will save that cost many times over.

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★ STEFANSSON'S

OWN STORY of his

FIVE YEARS in the ARCTIC

Over five years ago Vilhjalmur Stefansson, the famous Arctic explorer, was commissioned by the Canadian Government to lead a party into the uncharted space that extended from the north-westerly boundaries of Canada on to the North Pole. Shortly after the party got away the news came back to civilization that Stefansson and some of his party had drifted out into the Arctic seas on an island of ice and they were given up as lost. But Stefansson came back, safe and sound after four years of amazing adventures, during the course of which he made many discoveries of scientific and geographical value. Mr. Stefansson has written his story of this wonderful journey and exclusive Canadian rights have been purchased by MACLEAN'S MAGAZINE. It starts in the April issue and will continue for six months. It is a thrilling narrative—unquestionably the most important Canadian story of the year.

★ Stefansson's story will be published exclusively in Canada in MACLEAN'S. The series of articles by him, now appearing in American and Canadian newspapers, refer entirely to his experiences on previous explorations and do not deal with the journey that he undertook for the Dominion of Canada and completed last year.

Other Outstanding Features of April MacLean's

"Imperial Relations Must be Worked Out," by Viscount Bryce. An important announcement on the future construction of the British Empire.

"Reconstruction in Turkey," by Stephen Leacock. A humorous article on the present condition of things in Turkey as seen by Canada's great humorist, and applied to Canadian conditions.

"Bulldog Carney," by W. A. Fraser. A splendid novellette of the Canadian West, complete in this issue. Illustrated by Charles L. Wrenn.

"Opening the New Book," by J. K. Munro. An article on the situation at Ottawa created by the new Liberal leadership—smashing, impartial, fearless.

"The Sun Gazer," by Charles G. D. Roberts. A remarkable animal story. Illustrated by Artheur Heming.

"Canada's Fishmonger General," by Thomas M. Fraser. An article on a young Canadian who put Canadian fish on the diet of the British armies by a series of Barnum and Bailey advertising stunts.

"Bombing the Boche," by Lieut. J. Vernon Mackenzie. The second of the two articles that Mr. Mackenzie has written on the whirlwind campaign of raid reprisals which so frightened all Germany.

"The Transformation," by Frederic S. Isham. Illustrated by Hanson Booth. The second instalment of this sparkling new serial.

"Man and Wife," by C. W. Stephens. Illustrated by R. M. Brinkerhoff. The first instalment of a three part story of Canadian life by a new Canadian writer—a delightful love story with a background of business intrigue.

The Review of Reviews

The best articles from all publications the world over are selected and condensed for this department. Some of the articles in the April number are:

The Man Behind Bolshevism.

Could German Fleet have been Destroyed.

The Secret Plans of the Allied Command.

Too Much Wilson.

Is the ex-Kaiser Haunted?

Next Government Will be Labor.

New Life of Deposed Princess.

A New Kind of Socialism.

Are We Communicating With Mars?

The Cohort of the Damned.

Has War Wiped Out Disease?

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BELLEVUE FURNACES

These tool forges are particularly adapted for the requirements of the small machine shop for annealing and tempering dies, cutters, reamers, etc.

Combustion is perfect and no flames come in contact with material. Built to stand the highest temperature. Doors are properly counterbalanced. In every way BELLEVUE FURNACES meet with the demand for durability, efficiency and convenience.

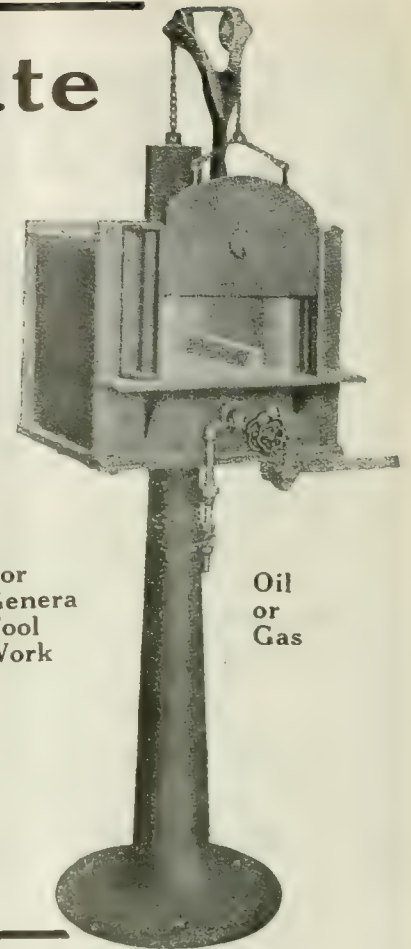
Let us advise you about your heat-treating problems.

Bellevue Industrial Furnace Company

Julius C. Hinz, President

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IMPERIAL CARBIDE



For
Welding
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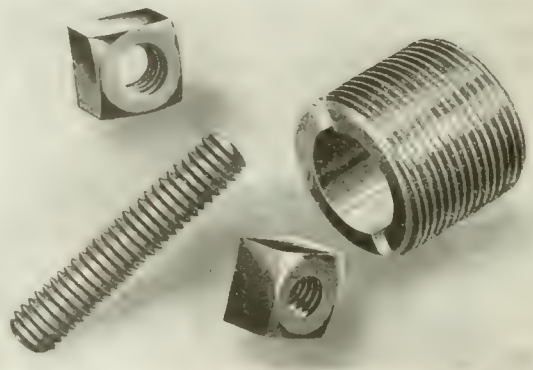


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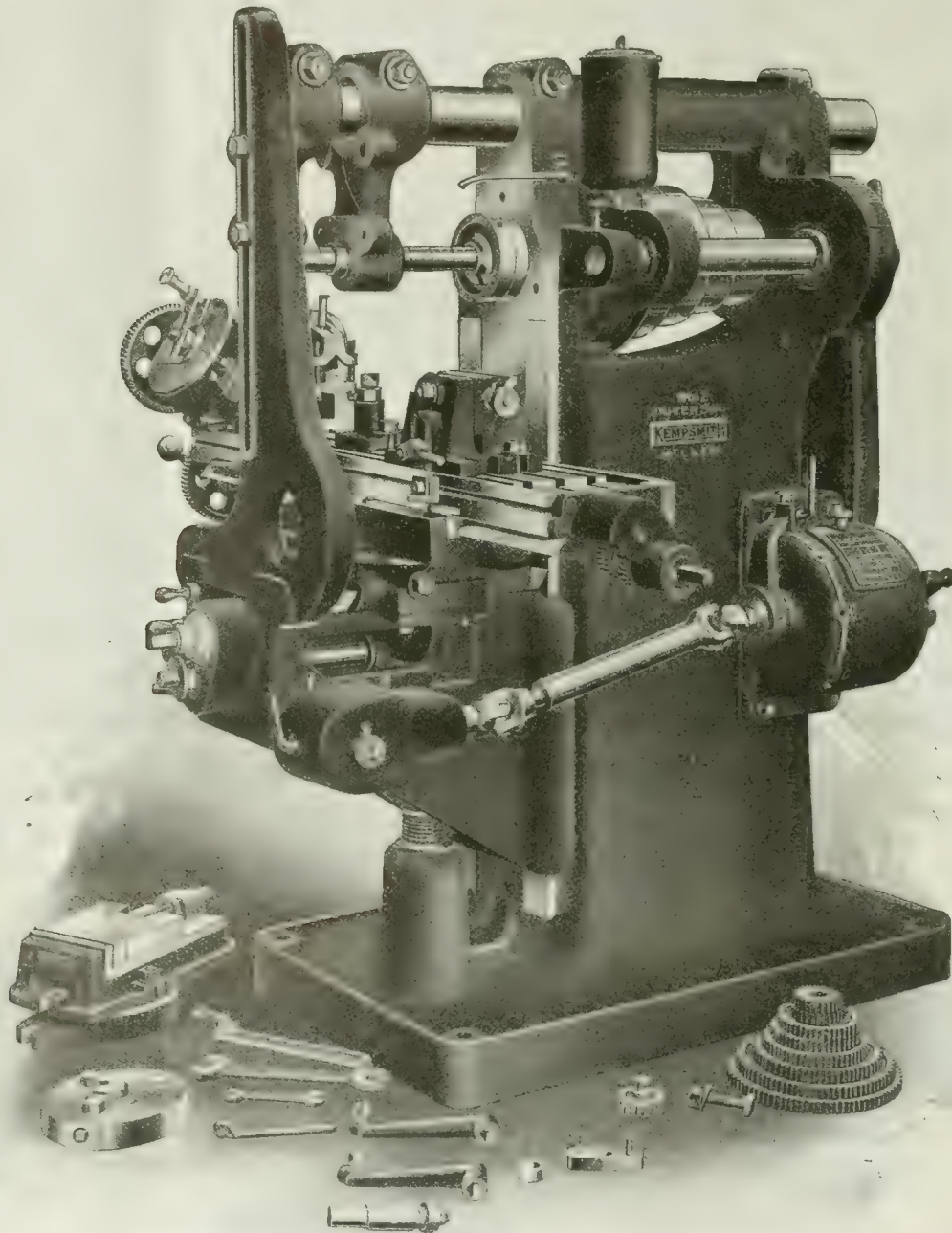
Manufacture Brass Automatic Screw Machine products. Capacity of machines $\frac{1}{8}$ in. to 2 in.

Send us your samples or blue prints, and we will quote prices. Satisfaction guaranteed.

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KEMPSMITH

MILLING MACHINES



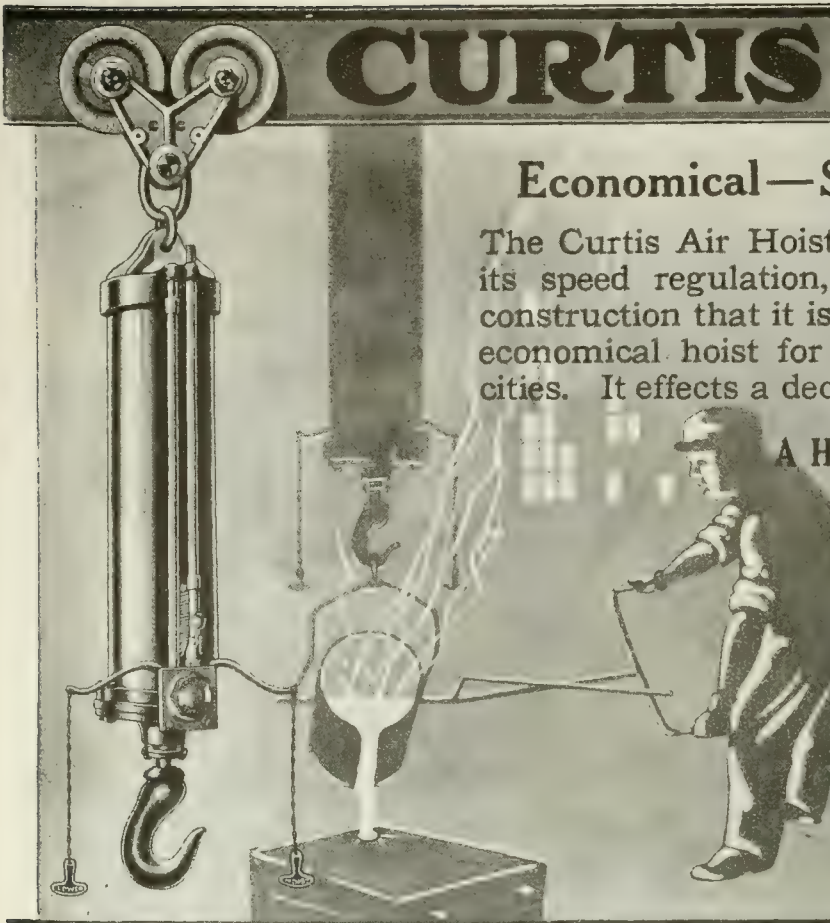
KEMPSMITH No. 2 Universal Milling Machine

Equipment—Double friction countershaft, 10½ inch Universal Dividing Head complete with tailstock, centering rest, Hill patent dog and driver, two index dials, set of change gears for spiral milling and index charts for operating; 6 inch Universal Chuck, 1 inch arbor, two arbor supports, brace, No. 3 Swivel Vise, outside tool shelf and all necessary crank handles, wrenches and accessories as shown.

THE KEMPSMITH MANUFACTURING COMPANY

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A Hoist to Meet Your Needs

CURTIS AIR HOISTS have been successfully adapted to meet a wide variety of needs in hundreds of the leading industrial plants throughout America.

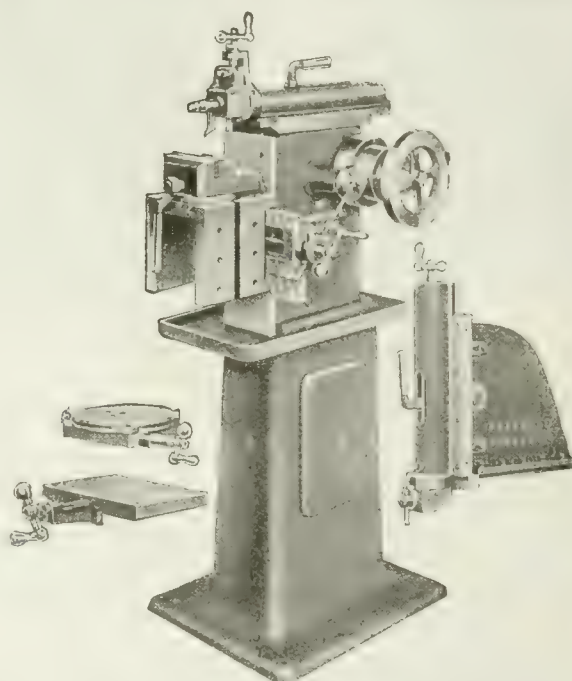
Our Engineering Department is at your service, ready to study any special conditions you have to meet and recommend suitable equipment. Illustrated descriptive literature and full information on request.

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Designed especially for making tools, dies, models — and shaping and slotting all classes of light work.

Rigid, well made, accurate in production and durable in service.



Can be quickly and conveniently changed from horizontal to vertical operation.

This feature exists in NO other machine on the market.

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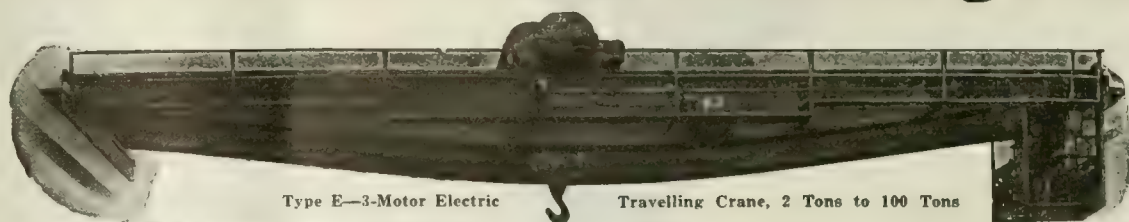
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Owned and operated by the Jacobs Mfg. Co.

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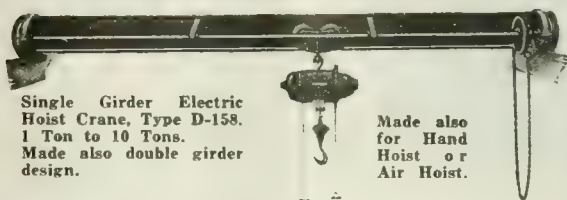
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Travelling Crane, 2 Tons to 100 Tons



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Made also for Hand Hoist or Air Hoist.

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In asking prices, state SERVICE, CAPACITY, SIZE OR SPAN POWER, and, if electric, KIND OF CURRENT.

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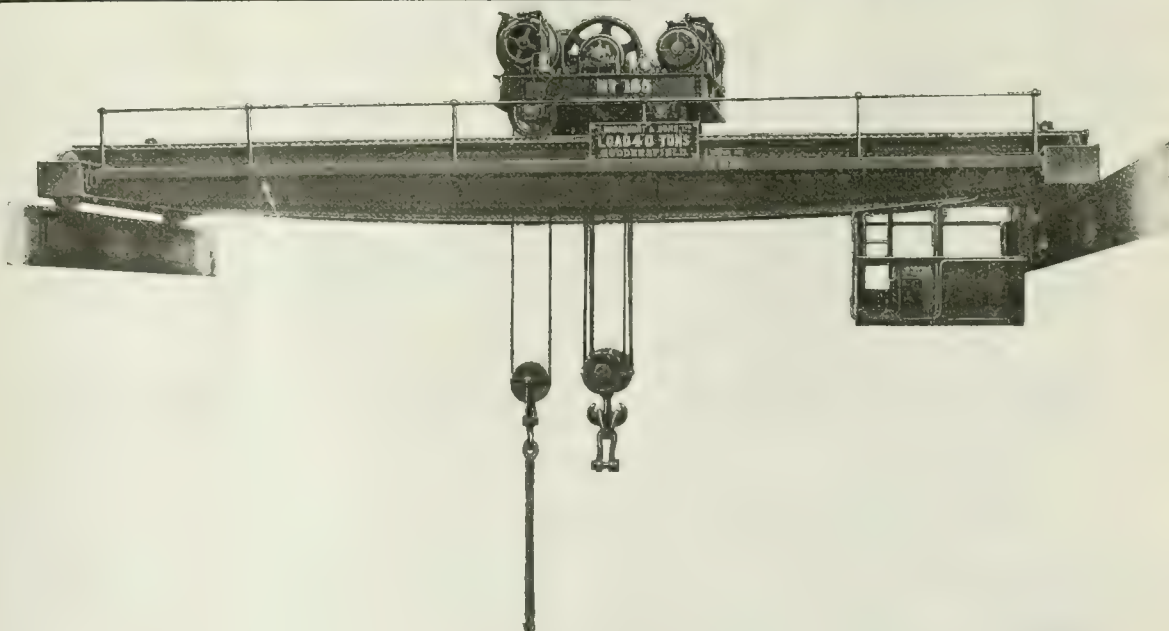
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Air Hoists, Trolleys and Tracks.

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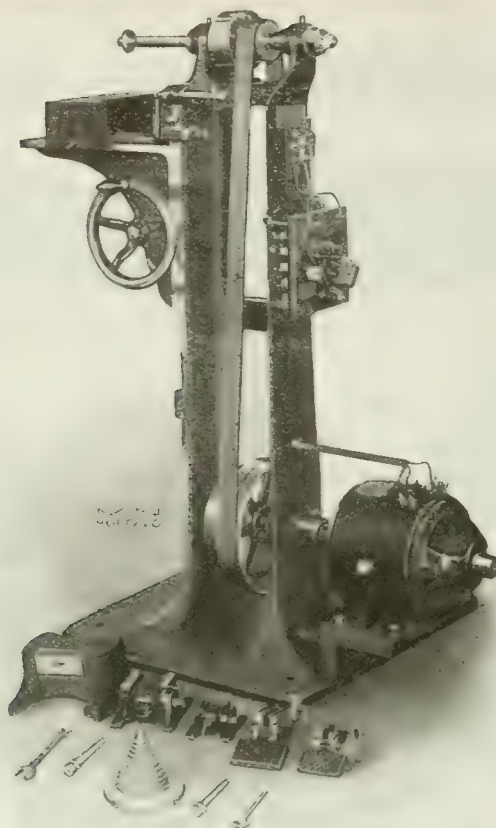
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Why let Die Trouble stand between you and maximum production?

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Modern Die Chaser Grinder

you will have a machine that does away with die trouble—because its output is **marvellously eccentric**.

Made for belt drive or a complete motor-driven unit. Special attachments for grinding Spring Dies, Pipe Dies, Reamers, Taps, Hobs, Spiral and End Mills, Milling Cutters, etc.; can be furnished with the regular equipment.

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Bulletin C. G. will give you full details. We would also be pleased to send you full particulars re "**Modern**" **Self-Contained Grinding Machines**. Tools splendidly adapted to meet the present demand for large production.

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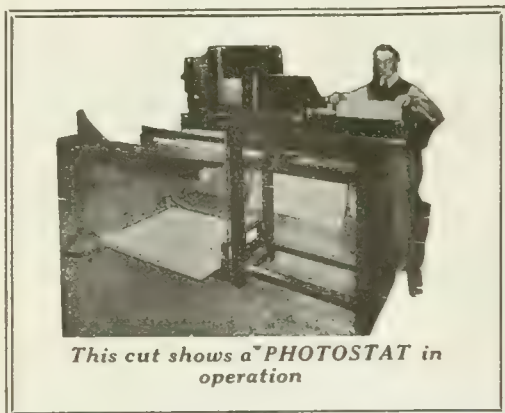
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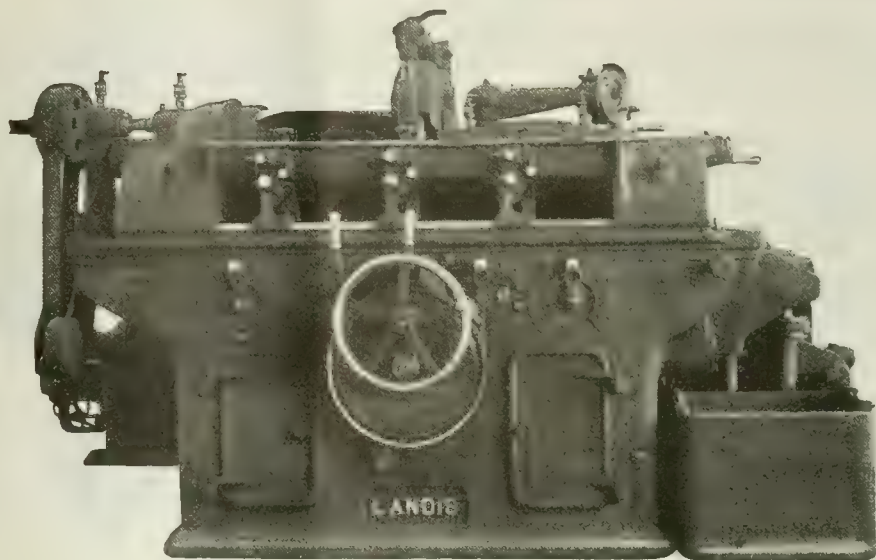
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Self-contained Plain Grinding Machine



No matter how excessive the tool-load may be, there can be no variation of the degree of accuracy because the work is held stationary—and "the wheel travels."

In addition the Landis is compactly and rigidly built to avoid any chatter.

A study of the machine will convince you of its many advantages and its fool-proofness. The built-in, labor-saving features insure big production.

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"The Marshalltown Throatless Shears"

guarantees perfect work at less than half the ordinary expense.

Rotary, self-feeding shears designed for cutting in and out curves, straight or irregular shearing, circles, also beveling and splitting of plates. Built in various sizes having capacities from tin up to $\frac{1}{2}$ " thick. No limit to the size of sheet being cut. Hand, belt or motor drives. The last word in metal cutting shears. We also manufacture Rotary Bevel Shears, Splitting Shears and Plate Milling Machines.

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The "B-T" Reverse Tapping Attachment fits any make drill press and is equally efficient on **all** of them.

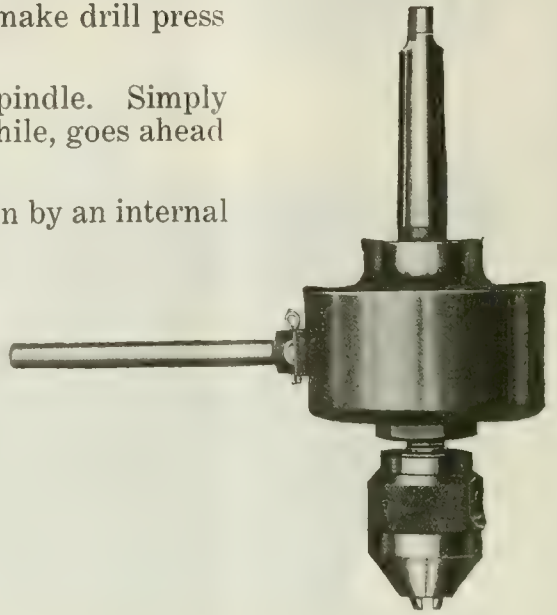
Eliminates necessity of reversing the machine spindle. Simply raising spindle reverses tap—the machine, meanwhile, goes ahead at full forward speed.

A reverse speed twice that of tapping speed is given by an internal gear drive. It is friction driven—automatically adjusted by the amount of pressure the operator puts on the drill spindle.

Can also be had with positive drive. Both plain and friction chucks are fitted with jaws to grip round and square end of tap.

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Write to-day.

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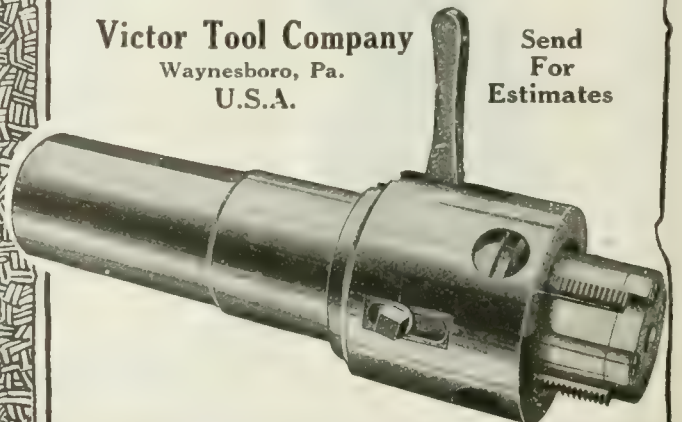
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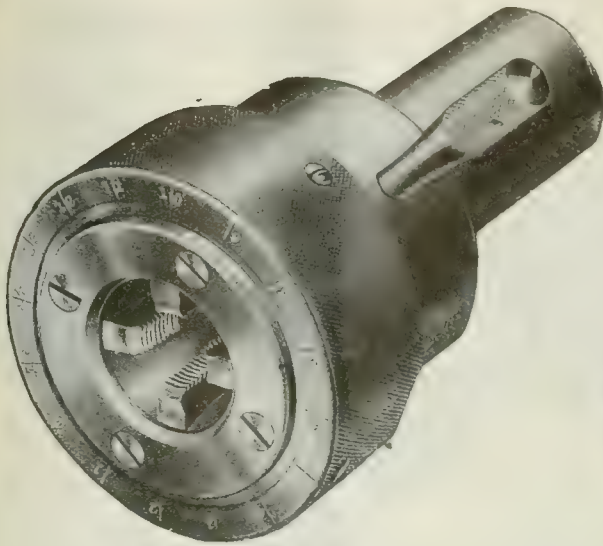
"**B**OTH in these operations and half another — I'll show you later — completed in the time our old taps took to do one; that, I guess, is why we continue to use your Victor Collapsible Taps."

It was the often-heard story of time saved, of costs lowered, of all threads clean and smooth. And it was pleasant to hear.

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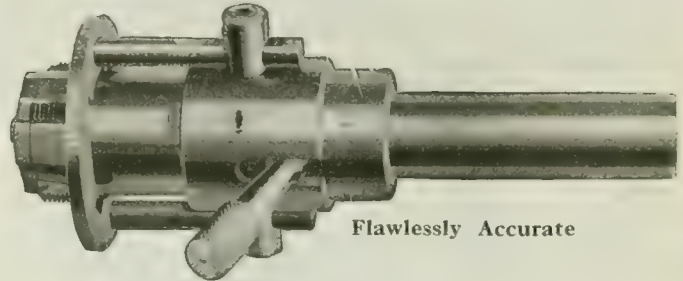
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**COLLAPSING TAPS
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Flawlessly Accurate

Wonderfully Fast and Durable

Two Murchey Taps on your lathe completely finish these so that when they come off the machine there is no more handling or re-sizing to do. No need of taking out of one lathe and putting it in another. No

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Murchey Chasers are quickly adjusted to compensate for wear, and Murchey Adjustable Taps serve as long as ten solid taps. Write at once for full particulars.

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H & G

Die Head Cuts Perfect Threads

The H. & G. Die Head illustrated is only 3 5/8" outside diameter, yet it will cut from the smallest up to 1" standard thread and up to 1 1/8" fine threads. For absolute proof of its ability to stand up and give good results, see the perfect threads it cuts on nickel steel. You can see these many places, but in almost any automobile or aeroplane plant for certainty.

Made in 9/16", 1", 1 1/2" and 2" sizes.

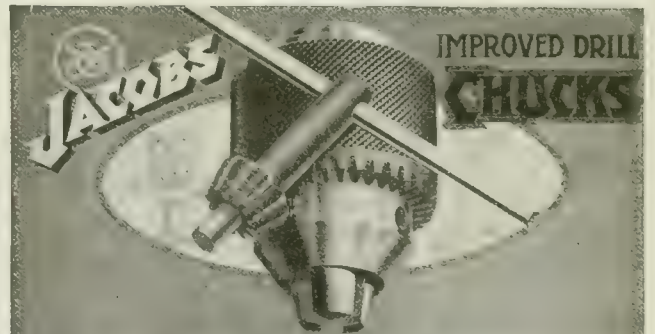
No stronger, more durable, more accurate Die Head was ever made.

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New Haven - Conn.

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Nickel
Steel**



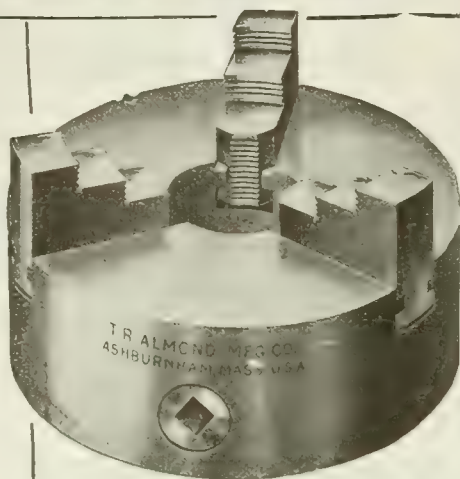
Wherever there is the
whirl of drills—there, too,
you find Jacobs Chucks.

Their success, never ques-
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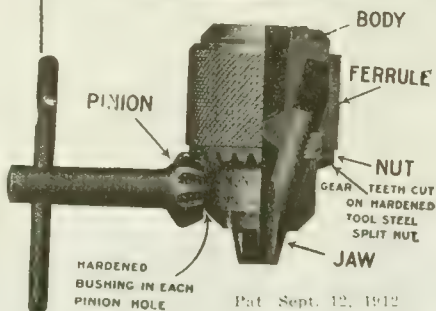
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ALMOND CHUCKS & MICROMETERS

Give them
a try out.
Universal
Geared
Scroll
Chuck—
Sizes 5",
6", 7½", 9"
and 12".



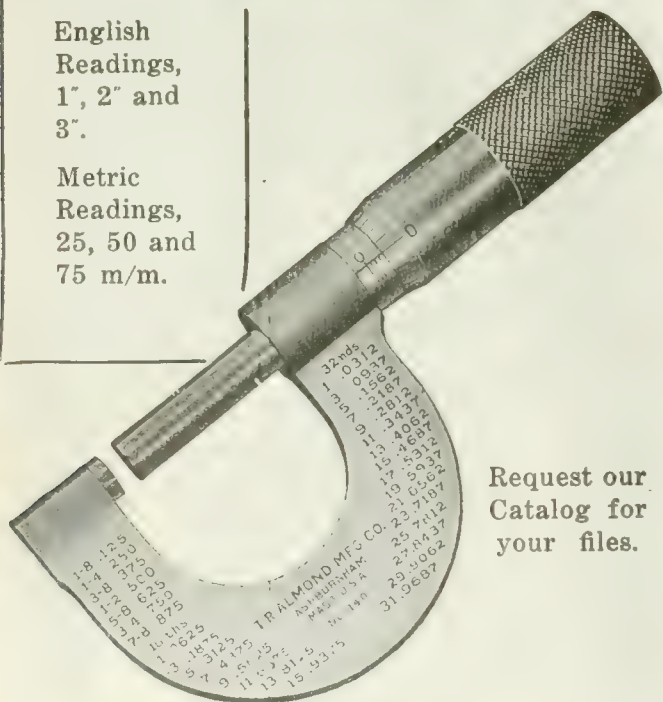
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Chucks, in
various
capacities,
0" to 1".



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meter
Calipers—

English
Readings,
1", 2" and
3".

Metric
Readings,
25, 50 and
75 m/m.

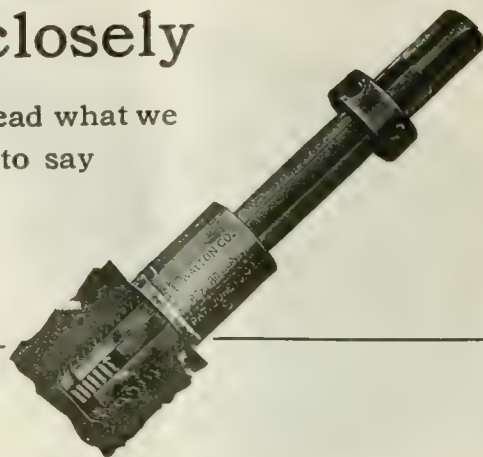


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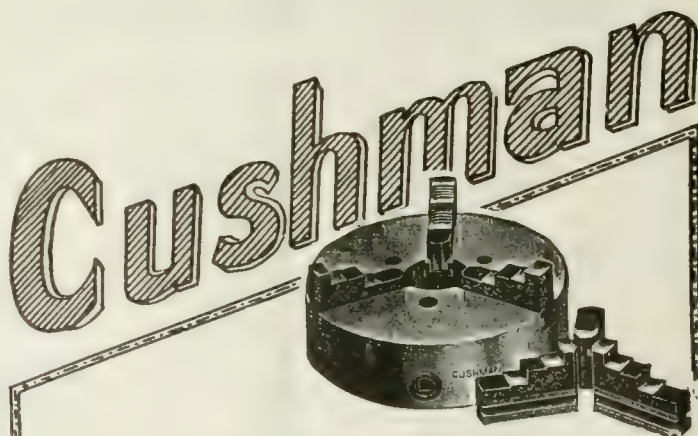
Look at this again —closely

and read what we
have to say
below



WHEN a tap breaks off close or below the surface, you'll find this Walton Tap Extractor will save a great deal of time and trouble. The crucible fingers grasp the flutes of the tap, a twist of the wrench and the piece is out. Don't you think it would pay to have a few lying around on your benches?

The Walton Company
Hartford, Conn.



**The "Cushman" Chuck of to-day
is the fruit of nearly sixty years
of Chuck building**

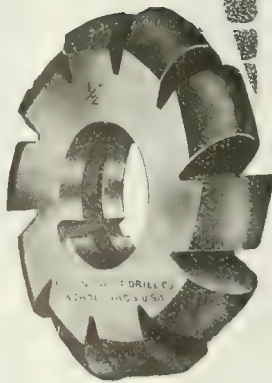
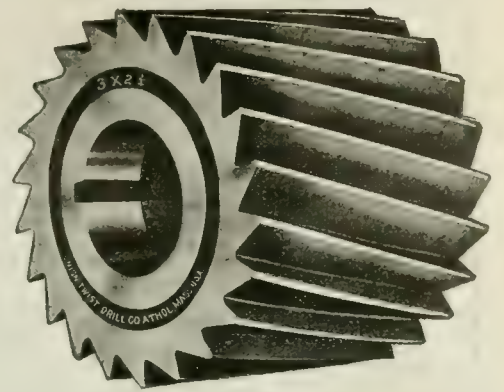
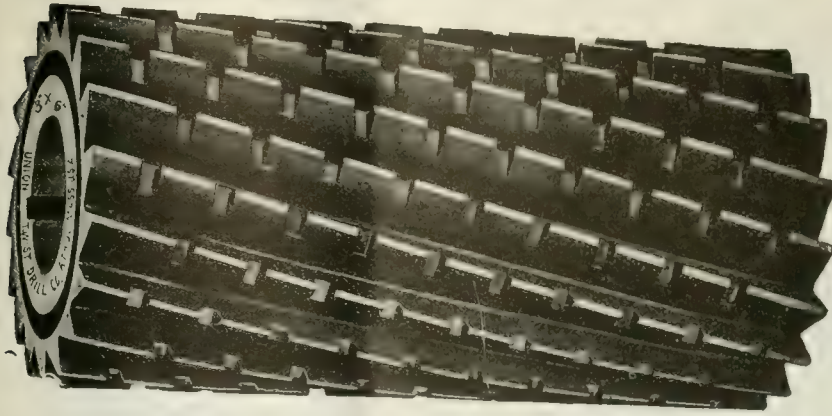
And right from the start in 1862, they have been known throughout the industry for their high quality Material and Workmanship.

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Send for our Catalogue showing complete line of Lathe Chucks, Drill Chucks and Portable Face Plate Jaws.

Cushman Chuck Co., Hartford, Conn.

CHUCKS



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TWIST DRILLS GEAR AND MILLING CUTTERS

(Carbon and High Speed Steel)

It will pay every manufacturer, who is not acquainted with Butterfield Tools, to measure their quality by the test of long, hard SERVICE.

You'll find the Butterfield durability the key to tool economy.

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Rock Island, Quebec

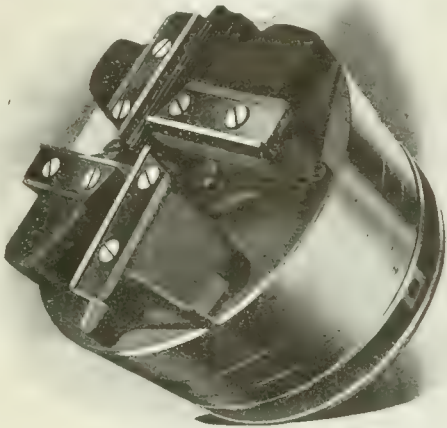
Toronto Office:
220 King Street West

LANDIS—The Reconstruction Threading Tool

Threads will play a mighty big part in reconstruction here and abroad. Economy in producing these threads will be more important now than ever, and it is vitally necessary that the most efficient and most economical machines be employed.

Landis Die Heads and Machines will meet all demands, whether for quality, production or low threading cost. The chaser is fundamentally different in design from any other thread-cutting tool, and this design insures clean-cut, well-formed threads on iron, steel, brass, monel metal or any material.

Production is doubled due to the chaser having a strictly tangential disposition to the cutting edge, thereby eliminating all unnecessary friction.



Threading costs are reduced from 50 to 75% since the chaser is merely given a slight grinding at the cutting edge, when dull. The chaser has three inches of available cutting material, which permits of 90 to 120 grindings, and no annealing, hobbing or retempering is necessary.

Familiarize yourself with the other big features; they are worth knowing.

Ask for Catalogue No. 24

LANDIS MACHINE COMPANY
Waynesboro, Pa.

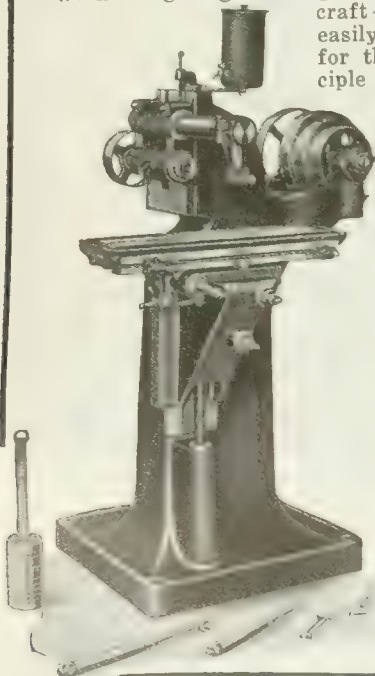


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**U.S.
MILLER**

should be used for milling small parts. They too are quicker, more easily handled and more capable for this work than big tools. You can actually reduce your milling costs one-third to one-half on each part by the use of the U. S. Hand and Weight Miller. Finely built to combine speed, accuracy and durability.

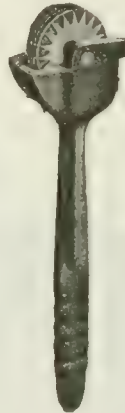
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For all ordinary shop grinding wheels specify "Diamo-Carbo"—the perfect diamond substitute.

For large, coarse, hard wheels ask for the "Desmond-Huntingdon."

Sherman Corrugated, 2 sizes
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Magazine
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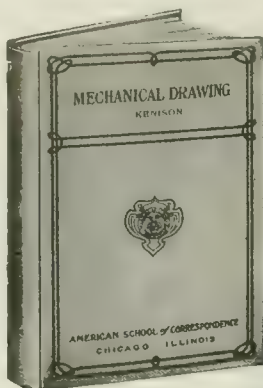
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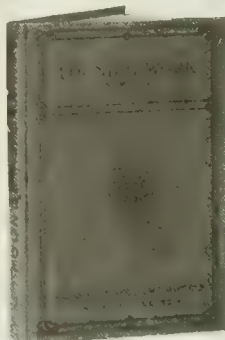


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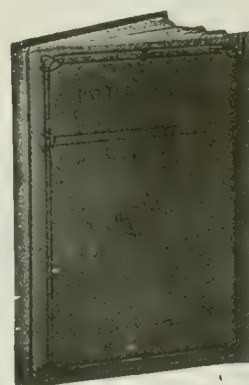


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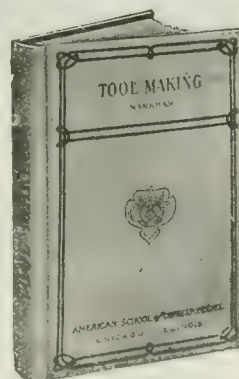
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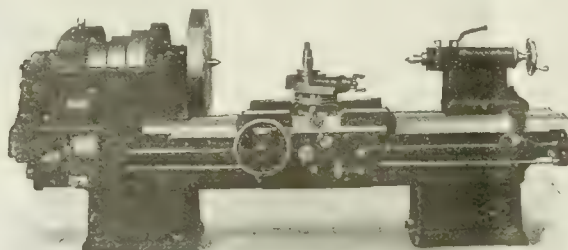
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*Sidney
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*Heavy
Duty
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Lathes*

SIDNEY

Sidney-for-Service Lathes are noted for their power and rigidity. Take deep cuts through toughest metal without pause or chatter.



Specifications include 3-step cone, double back gear, semi-quick change gear lathe, built on 10 ft. bed. This lathe also furnished with quick-change gears. Bed lengths available: 10, 12, 14, 16, 18 and 20 feet.

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The Sidney Tool Company, Sidney, Ohio

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are dependable springs

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CONN.**



No. 121
Die Adapter



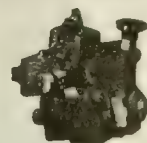
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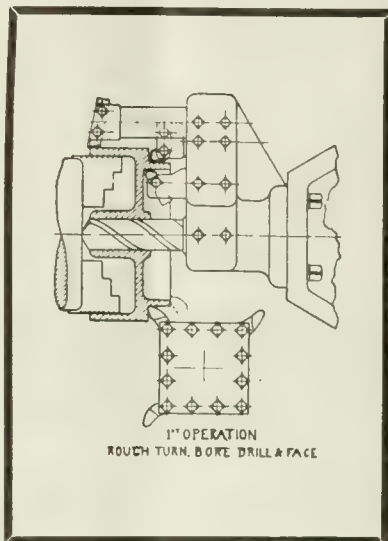
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ROUGH TURN, BORE, DRILL & FACE

THE FOSTER LINE

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SCREW MACHINES

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No. 2 FRICTION HEAD UNIVERSAL TURRET LATHE
Bar Cap. 1 1/2" 14" Swing
No. 2 FRICTION SET-OVER TURRET LATHE
Bar Cap. 1 1/2" 14" Swing
No. 3 FRICTION HEAD UNIVERSAL TURRET LATHE
Bar Cap. 1 1/2" 16" Swing
No. 3 FRICTION HEAD SET-OVER TURRET LATHE
Bar Cap. 1 1/2" 16" Swing

THREAD MILLERS
Manufactured under the Holden & Morgan Patents

What Would it Mean To You in Dollars and Cents

to have five cutters working
simultaneously on your work?

That is what is taking place in
the first operation on this pulley.

But other things are required
also to obtain maximum produc-
tion and lowest cost. The com-
bination of cutters, speeds and
feeds must be correct for the
material worked upon; the lip
and clearance angles of the cut-
ters must be ground right and the
tools must work in the proper
sequence.

These are problems for the
trained production engineer to
solve.

The Foster Engineering staff is
at your service. Avail yourself
of their skill and knowledge.



No. 155
Recessing and
Boring Tool



No. 140
Pointing Tool



No. 149
Rear Forming
Tool Holder



No. 103 B
Split Bushing



No. 139
Multiple Cutter
Turner



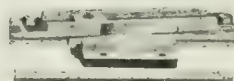
Push-Out Collet
with Bushings



Draw-Back Collet
with Bushings



No. 103A
Flat Cutter Bushing



Taper Attachment



No. 102 A
Adapter for
Forged Cutters

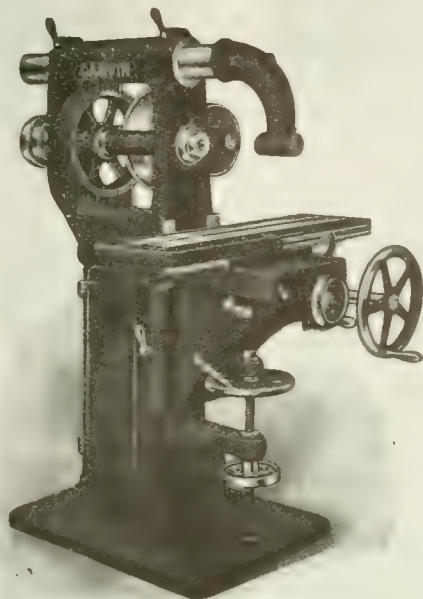
No. 107C



Pilot Bar

Foster Machine Co., Elkhart, Ind., U.S.A.

GARVIN No. 11 Plain Milling Machine



No. 11 Plain Milling Machine
Use Code Abode

Adapted to the lightest kinds of small milling and light manufacturing and suitable for jewelers, makers of electrical goods, brass workers, sewing-machine manufacturers and others.

The Features of the Machine Are:

Telescope Arm.
Hardened and ground Tool-steel Bearing for arbor in arm.
Spindle Bearing Taper, with adjustment.
Power Feed driven by vertical worm shaft inside of column, which drives a worm gear clutched to the pinion shaft in the knee.
Feed Works located and protected inside of column.
Quick and sensitive movement of Table by Adjustable Lever and Rack Pinion.

Micrometer adjustments of Knee and Saddle.

Oil Pan around table.

Elevating Screw does not pass through the floor.

Power Feed of Table	12½ in.
In and Out Adjustment	4½ in.
Vertical Adjustment	10 in.
Net Weight, Skidded	600 lbs.

For Further Information { ASK YOUR DEALER
or WRITE US DIRECT

IMMEDIATE DELIVERIES

Send for Complete Catalog

MANUFACTURED BY

THE GARVIN MACHINE COMPANY

Spring and Varick Streets

(Visitors Welcome)

50 Years New York City

Wherever Pipe is Cut or Threaded Economically

The probability is two to one that it's a

Williams Pipe Machine

that's on the job.

For in approximately two-thirds of all the larger plants in this country Williams' Pipe Machines are used.

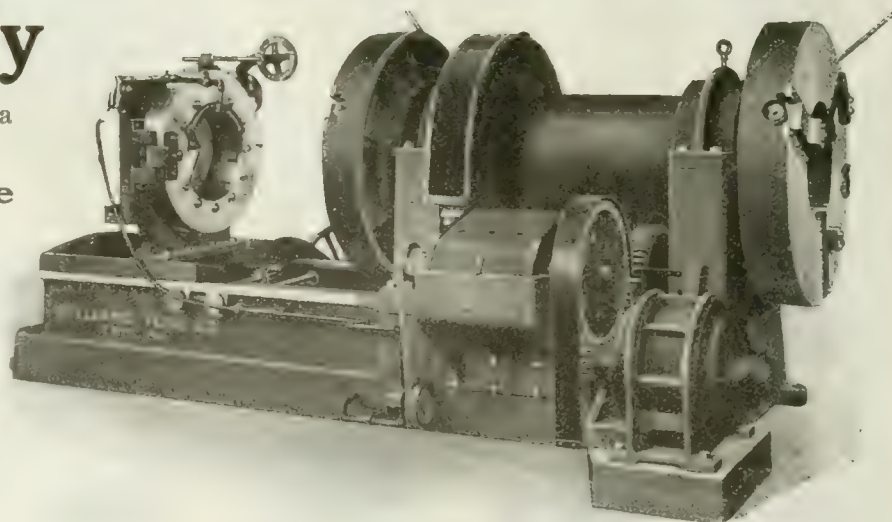
It was the Williams Pipe Machine that brought highest honors home from the Panama Exposition.

The Machine illustrated has a capacity of 21½" to 12". Also nine other sizes to meet your requirements.

Write

Williams Tool Company

Erie - Penn. - U.S.A.



Canadian Agents:

The A. R. Williams Machinery
Co., Ltd. Toronto Canada

European Agents:

Universal Machinery Corp.
London - England

Keep This List For Future Reference

Classified Index of Oil Handling Equipment

Circulating Systems for Lubricating Oil;
Curb Pump for Oil and Gasoline;
Cutting Oil Reclaiming Systems;
Dry Cleaning Naphtha Storage and Distributing Systems;
Filling Station Equipment;
Filtering and Circulating Systems for Lubricating Oil;
Fuel Oil Systems;
Gasoline Meters;
Gasoline Pumps, Self-Measuring;
Gasoline Tanks;
Hand Pumps for Oil and Gasoline;
Kerosene Pumps, Self-Measuring;
Kerosene Tanks;
Lubricating Oil Filtering and Circulating Systems;
Lubricating Oil Storage Systems;
Lubricating Oil Storage Tanks and Pumps;
Meters for Oil, Kerosene, Gasoline, etc.;

Naphtha Storage and Handling Systems for Dry Cleaners;
Oil Meters;
Oil Pumps;
Oil Storage and Distributing Systems;
Oil Tanks;
Paint Oil Storage and Handling Systems;
Pipe Line Registering Measures (Meters);
Power Pumps for Oil, Gasoline, etc.;
Railway Oil Storage and Handling Systems;
Reclaiming Systems for Oil;
Registering Measures;
Remote Control Systems for Oil and Gasoline;
Rubber Cement Tanks and Pumps;
Self-Measuring Pumps for Oil and Gasoline;
Tanks for Oil, Gasoline, Kerosene, etc.;
Tanks for Underground Storage;
Underground Tanks;
Wheel Tanks for Lubricating Oil and Gasoline.

THERE IS A BOWSER SYSTEM FOR EVERY REQUIREMENT.

Write BOWSER To-day.

Tell us what kinds of oils and how much you use.

Detailed information will be mailed on any particular outfit in which you would be interested. We also offer to you the services of our special engineers in making a survey of your plant and planning a complete gasoline and oil storage system suited to your needs.

S. F. BOWSER AND COMPANY, Inc., Ft. Wayne, Ind., U.S.A.

Canadian Office and Factory, Toronto, Ont.

LONDON
32 Victoria Street S.W. 1

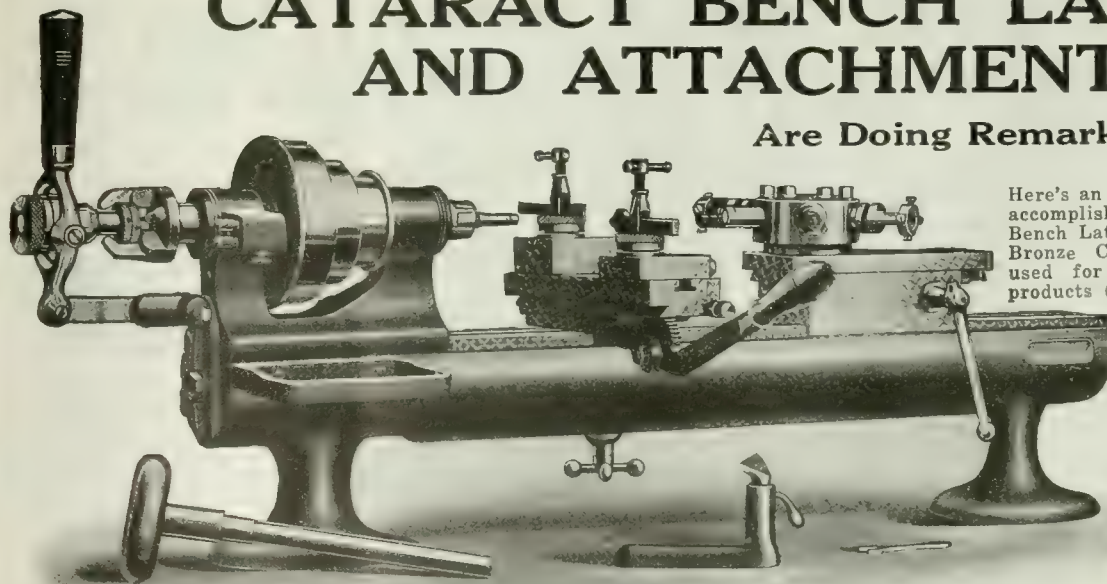
PARIS
5 Rue Denis-Poissons

HAVANA
Lonja del Comercio 427

SYDNEY
6 Castlereagh Street

CATARACT BENCH LATHES AND ATTACHMENTS

Are Doing Remarkable Work

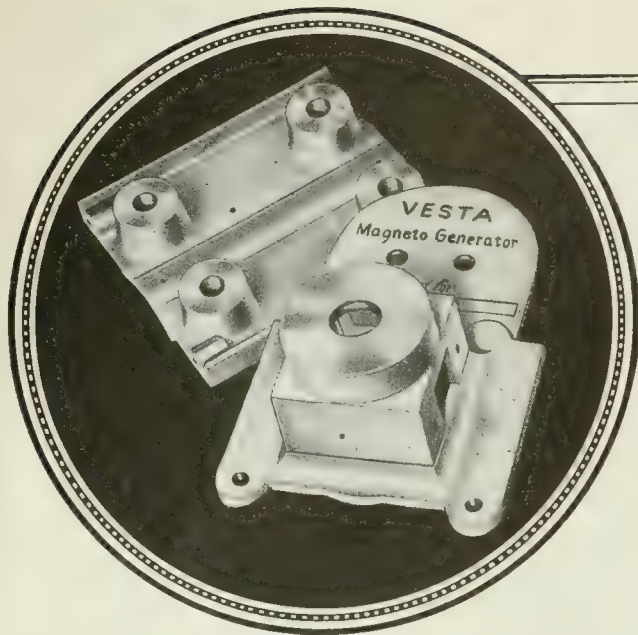


Here's an example of what was accomplished with a Catacract Bench Lathe: In the American Bronze Corporation they are used for finishing Non-Gran products (largely bushings). It is conceded that Non-Gran Bronze with its distinctive, dense, tough quality, is more difficult to machine than many grades of steel. Limits are .005" on length, .002" for flanges and .0005" for diameters and concentricity — .00025" not infrequently required; but no matter how exacting requirements, four "Catacracts" handle the work to complete satisfaction of all concerned.

Catacract Bench Lathes Have Made Good Everywhere
Write for our Catalog

Hardinge Bros., 1770 Bertau Avenue, Chicago, Ill.

ALFRED HERBERT CO., Limited, Coventry, England, are our representatives for United Kingdom, France, Belgium, Russia, Japan, Manchuria, Korea, Formosa, China, Italy.



"Die-Cast It"

Die-castings have solved many a manufacturing problem.

Good die-castings are durable, accurate parts. Where applicable they differ from machined parts only in lower cost and more consistent uniformity. They represent years of intensive study by metallurgists, engineers and designers.

The Franklin Manufacturing Company

originated the die-casting process in America 27 years ago. It has always led the way in perfecting it. Difficult problems have always come to Franklin.

To Canadian manufacturers wishing to speed up production and cut costs with absolutely no loss in the efficiency of their product, the Franklin Manufacturing Company offers the services of its expert metallurgists, designers and engineers.

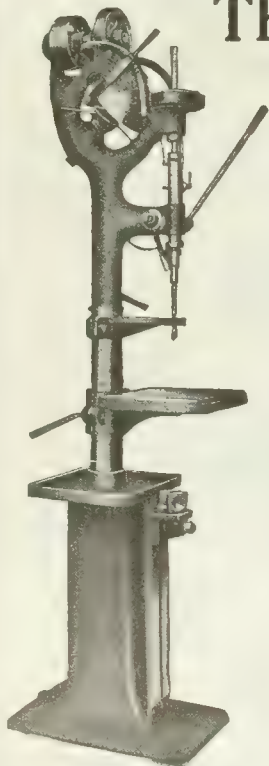
Send samples of blue prints to-day for a report on the practicality of using die-cast parts. Write, too, for Booklet "C" containing interesting facts about die-casting.

Franklin Mfg. Company

746 Gifford St., SYRACUSE, N.Y., U.S.A.

FRANKLIN DIE-CASTINGS

A HIGH SPEED Tool Room Drill The ALBANY



This light service drill has unique features which put it in a class by itself.

The machine starts rapidly, has quick speed change and unusual facility for changing drills. Accuracy of drilling depth is assured without measuring and all other features of the "Albany" are similarly designed to increase its capacity for quick, accurate drilling up to 1/2 in.

Details in Circular

FOREIGN AGENTS: F. W. Horne & Co., Tokyo, Japan, China, Korea. R. L. Scrutton Co., Ltd., Sydney, Australia and New Zealand. Litton's Machine Tool Co., London, England. A. Berthoin, Grenoble, France. V. Lowner, Copenhagen Denmark. Aktiebolaget, Rylander, Asplund, Stockholm, Sweden. Gillespie Bros. & Co., South Africa (New York City). Monti & Os-curo, Milan, Italy.

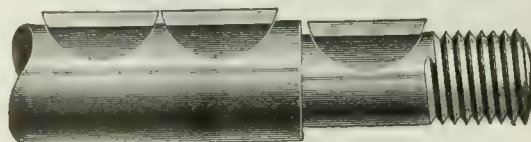
**Albany Hardware
Specialty Mfg. Co.**

ALBANY - WISCONSIN

"WHITNEY" MACHINE KEYS

For the

Woodruff System of Keying

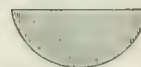


If you are not already using the "Woodruff System" write us at once. Remember that the operations of cutting the Keyseats and inserting the Keys require no skilled labor. Used by all manufacturers to whom economy, rapidity, and interchangeability are essential.



Furnished in our Special
Carbon Steel

Furnished in Nickel
Steel Heat Treated



The Whitney Mfg. Co.
HARTFORD, CONN.

Chains Keys and Cutters Hand Milling Machines

POTTER & JOHNSTON

AUTOMATIC MILLING MACHINES

HORIZONTAL VERTICAL

EVERY working part of this machine is built with a view to **increased production.**

CONTINUOUS MILLING

No lost time due to machine idleness because the operator is loading one fixture while the cutter operates on the other.

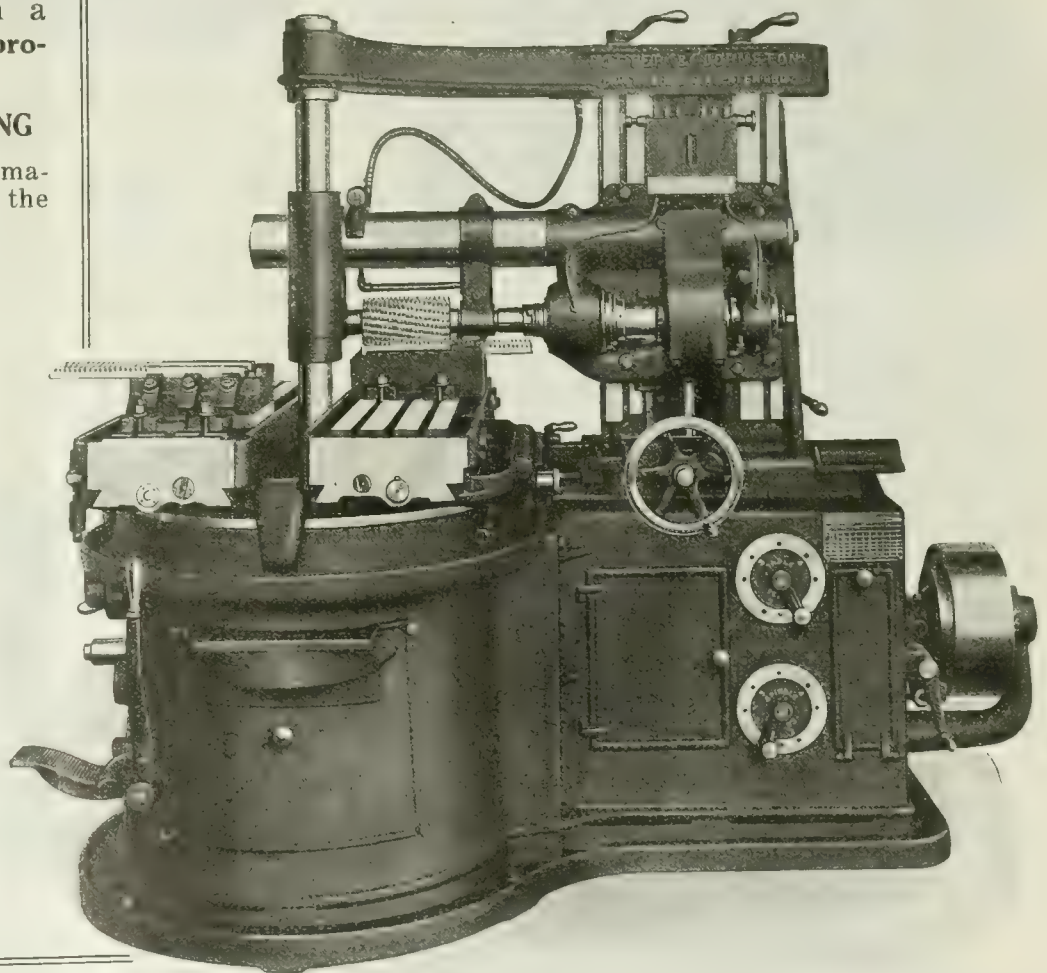
16 Table Feeds,
 $\frac{7}{8}$ in. to 12 5-16 in.

Length of Table Feed, 28 inches.

12 Spindle Speeds, 20 to 180 R.P.M.

Send us your Blueprints and we'll gladly give you production figures.

Bulletin 36 on application.



Canadian Offices: POTTER & JOHNSTON MACHINE CO., Pawtucket, R.I.

ROELOFSON MACHINE & TOOL CO., LTD.

Head Office: 1501 Royal Bank Building, Toronto, Canada
Works and Warehouse: Galt, Ont., Canada

FORD TRIBLOC



The Tribloc is the kind of "helper" that will handle any sort of a load quickly, surely and safely. It doesn't lag or slip, doesn't get in the operator's way, doesn't break down on the job. It can do more than a gang could, without the confusion, and in far less time. For shifting massive pieces or placing heavy moulds, it saves time, effort and men.

The planetary gearing, **all steel** working parts and the patented loop hand-chain guide insure strength, durability and safety in operation at any angle or speed. A Tribloc is so efficient and so well made, we guarantee it for five years. You're as safe in buying it as the workmen are in using it.

A Tribloc is the extra "help" you've been needing. Ask for our catalog, which gives details and prices.

FORD CHAIN BLOCK & MFG. CO.
Second & Diamond Sts. PHILADELPHIA, Pa.

OVER SEAS REPRESENTATIVE
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA
120 BROADWAY, NEW YORK U.S.A.

2150-11

Production of Rare Quality at Lowest Labor Costs

There is unusual strength, accuracy, speed, convenience and range in

AURORA Drilling Machines



You can use them to great advantage on any work in your shop that's suitable for a machine tool of this kind. The operating is easy and the labor cost comparatively low.

Drop a line for full particulars and specifications.
Stationary Head Sizes 20"—21"
Sliding Head Sizes 22"—44"

The Aurora Tool Works
AURORA, INDIANA, U.S.A.

The

BARNES



DRILLS



Complete line. 8-inch to 50-inch swing

Gang Drills.—Horizontal Drills.

SEND FOR CATALOG.

W. F. & JOHN BARNES CO.

104 Ruby Street - ROCKFORD, ILL.

Canadian Agents—A. R. WILLIAMS MACHINERY CO.
Toronto, Winnipeg, Vancouver, and St. John, N.B.
WILLIAMS & WILSON, Montreal

Here's Information You Need!

In view of the modern trend toward welding as a means of labor, time and money saving, and the positive superiority of **ARMCO IRON** filling material, every well posted welding engineer should have this book of valuable information at hand for quick reference.

"Armco Iron Welding Rods and Wire" is not merely a catalog, but treats in a helpful way of the following subjects:

Requisites of a desirable filling material.

Welding of mild steel and wrought iron.

How and why the new American product ARMCO IRON surpasses the now unobtainable genuine Norway and Swedish irons as a welding material.

How a single composition of ARMCO IRON supplants a large number of compositions of other welding materials.

Analysis and physical tests of ARMCO IRON.

Typical examples and illustrations of welding done with ARMCO IRON.

Emergency Fleet Corporation specifications for welding wire.

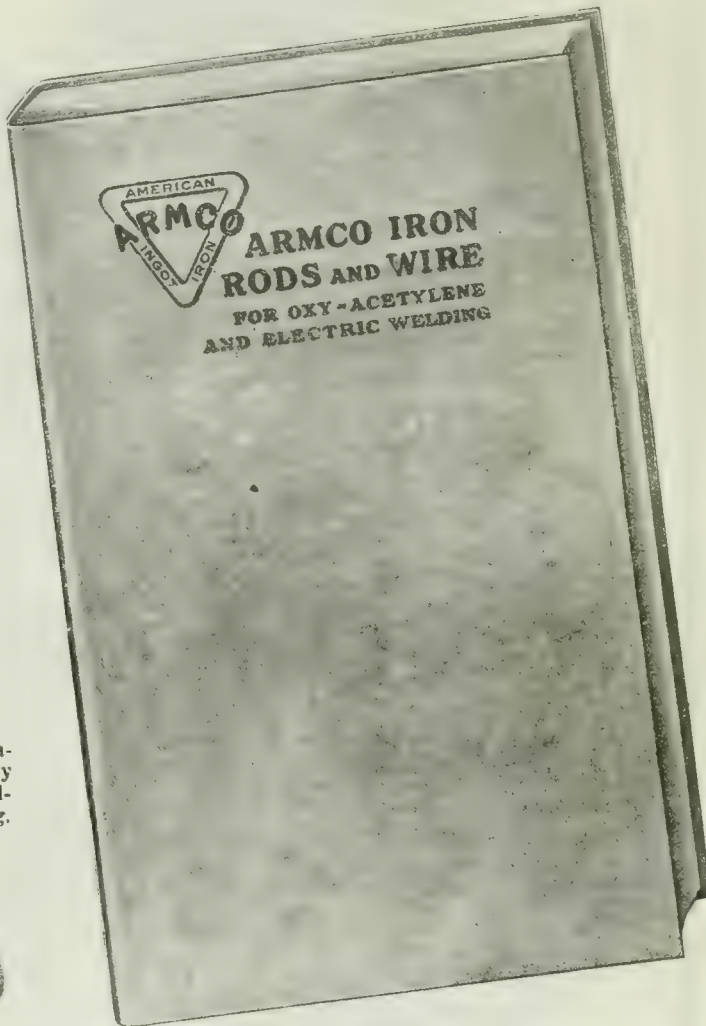
Microscopic study of steel and iron with reference to welding.

Cost cards for keeping tab on welding jobs.

Metallurgy of iron and steel, including color chart for heat treatment.

Miscellaneous useful data including tables of wire gauges, conversion of temperatures from Fahrenheit to Centigrade, properties of elements and metal compositions, decimal equivalents, metric conversion tables, definitions of electrical units, mensuration factors.

If you are a consulting, designing or managing engineer, shop superintendent or foreman, your free copy is ready for mailing on request, and the engineering advice of our welding specialists is also free for the asking.



Send for
your copy

PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.

Makers of "Copperweld" Copper Clad Steel Wire; ARMCO Iron Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

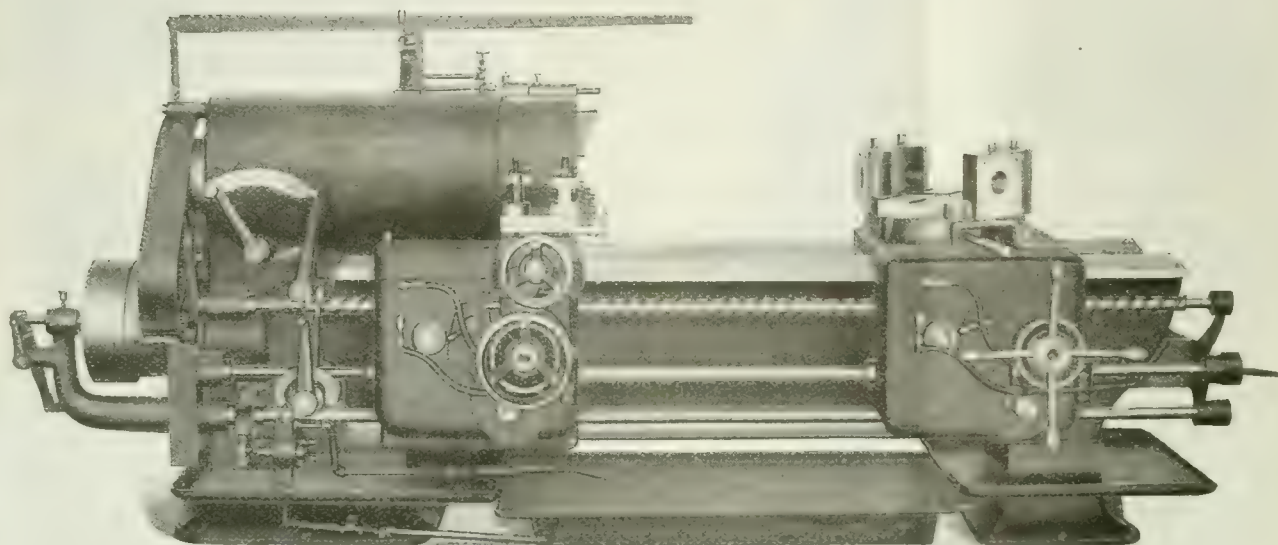
Plants: Monessen, Pa. and Adrian, Mich

Sales Offices: 30 Church Street, New York

Western Representatives: Steel Sales Corporation, Chicago



STEINLE



One of the reasons why the Steinle 24" Full Swing Side Carriage Turret Lathe is ahead of all others in the economical and accurate production of many classes of work.

The Constant Power Single Pulley Drive

This feature insures the same amount of power being delivered to the machine at all times. It does away with power losses due to variation in the amount of belt contact always in evidence when cone pulleys are used.

One belt furnishes power for all functions of the machine. As long as this one belt is kept in proper condition the operator never has trouble with the power traverse of the carriages or pump, as the power for operating these features is derived from the main drive through geared connections and not through belts.

No countershaft to oil or get out of kilter.

Consider the advantages: ONE BELT direct from line shaft or motor, Thirty Reversible Spindle Speeds, Power Traverse for Both Carriages, Independent Feed for Both Carriages, Cutter Lubricant Pump, ONE BELT.

The operator can give all his attention to the cutting tools, feeds and speeds, resulting in more and better work.

There are more good reasons why the Steinle 24" Full Swing Side Carriage Turret Lathe is ahead of all others in the economical and accurate production of many classes of work. We will give these reasons in future advertisements in this Journal. Watch for them. They will be interesting to you.

STEINLE TURRET MACHINE CO.

MADISON

WISCONSIN, U.S.A.

TRADE

FOX

MARK

REGISTERED

MILLING MACHINES

FOR

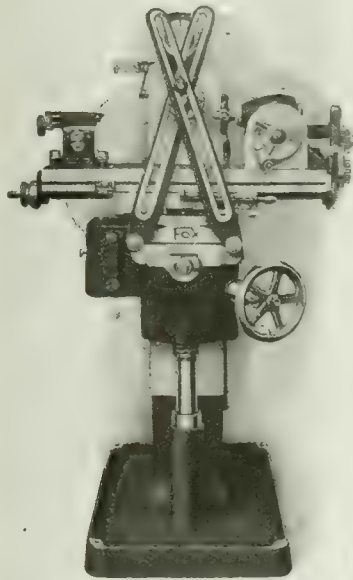
Rapid Production of Motor Parts

The demand for increased production **requires tools of great strength and durability**; the Fox 2-A Universal Milling Machine illustrated has met this demand, and is being used wherever extreme accuracy and quantity production are required.

The machine has a universal table, spiral cutting attachment, 10" Dividing Head with 6" Universal Chuck, making it a machine **especially adapted for Tool Room Work.**

The **United States Government** used this machine in its various **repair shops for Aero-plane Motors.**

You should be using this tool to help the production of parts necessary for reconstruction.



Specifications No. 2
A Miller.

Spindle speeds 12
From 21 to 423 r.p.m.

Table feeds 6
From .317" to 2.79"
per min.

Table 8½ x 27
Long. feed (power)
26"
Vertical feed (hand)
13"
Trans. feed (hand)
8½".

Drive...Single pulley
10 x 3" running 250
r.p.m.

Gears Hardened
steel.
Weight 1,500 lbs.

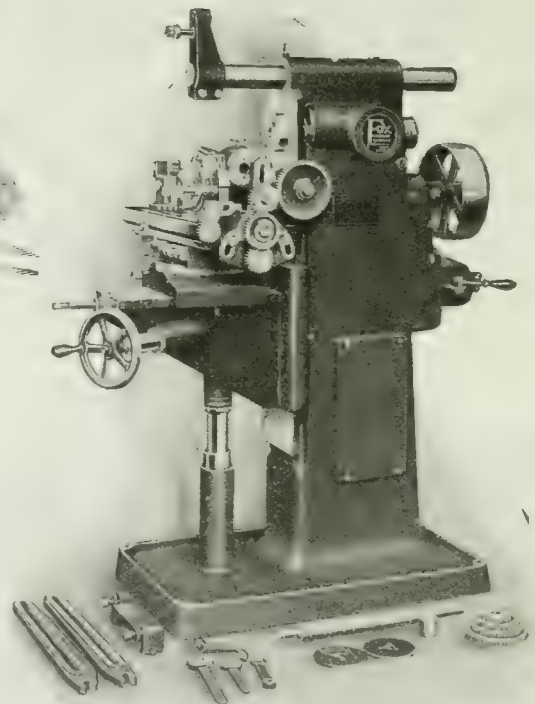
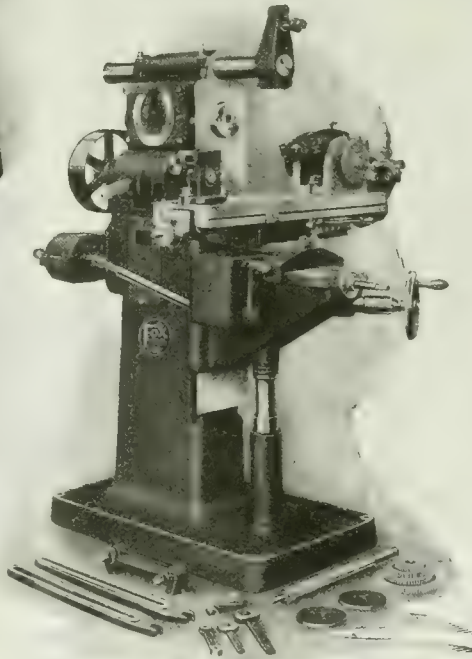
We build this same machine with a plain table, omitting the spiral cutting attachment and Dividing Head.

Our No. 1 type machine has a four-step cone drive, and while being a lighter machine is a "bear" for work. This was proven by the hundreds of them in the largest munitions plants.

We also build the Fox Multiple Spindle Drilling Machines.

FOX MACHINE COMPANY

1047 W. Ganson St., Jackson, Michigan, U.S.A.



Keep the Wheels of Production Turning

Today every production minute is vital. If production is to reach its maximum, the waste minutes must be saved. Lacing a belt only twice a year at an average of ten minutes time—some methods take half an hour—multiplies into a huge production loss, throughout industrial America. Old-fashioned, obsolete belt lacing methods must go.

The Clipper Belt Lacer Laces a Belt in Three Minutes

Any machine workman can lace a belt instantly with the Clipper. The low cost of the Clipper lacing tool makes possible immediate lacing—no running around the plant or calling for an expert.

The Clipper makes a durable and perfect joint—one that pulls better and is safer—is flush with the belt on both sides and is more flexible than the belt itself.

The Clipper goes to you for free trial.

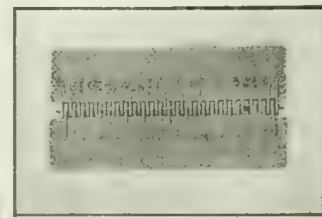
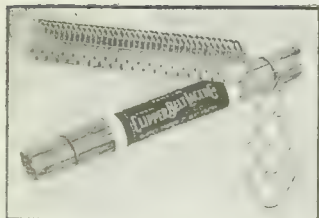
It is perpetually guaranteed where Clipper hooks are used.

The American Museum of Safety gave the Clipper the only gold medal ever awarded for metal lacing.

The use of the Clipper in your plant will solve effectively your belt lacing problems.

Clipper belt lacing predominates in every manufacturing center in the world

Some mill supply dealer in every city sells the
Clipper



**Clipper
Belt Lacer Company**

• GRAND RAPIDS •
• MICHIGAN • U.S.A. •



A Time Saver— Can You Beat It?

HAVE you noticed the Consolidated Clamp Connection on all Consolidated Presses? Grips like a vise and stays put, one of the bull-dog kind, which, when properly tightened, will not break away, or slip.

If you break it we will furnish a new one free of charge.

Consolidated Press Company

HASTINGS

LARGEST EXCLUSIVE MANUFACTURERS OF POWER PRESSES IN U.S.A.

MICHIGAN

Canadian Representatives: A. R. WILLIAMS MACHINERY CO., Limited, Toronto, St. John, Winnipeg, Vancouver

Cool Shop This Summer If You Use ECONOMIZER FORGE



IT is economical in power; protects workmen from flames and hot gases and the heated material from oxidation or scale; increases the quantity and improves the quality of heated products; prevents smoke, flame and heat escaping into forge shop.

Write to-day for catalog 34-T

W. S. ROCKWELL COMPANY

Furnace Engineers and Contractors

50 Church Street

New York

(Hudson Terminal Bldg.)

Canadian Representative: R. J. McLean
128 Bleury St., Montreal, Canada.

STANDARD FURNACES

OIL
or
GAS

Prompt delivery on
all tool room types.

For



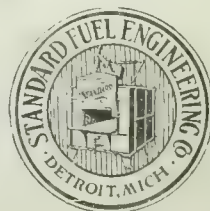
Rivet Heater

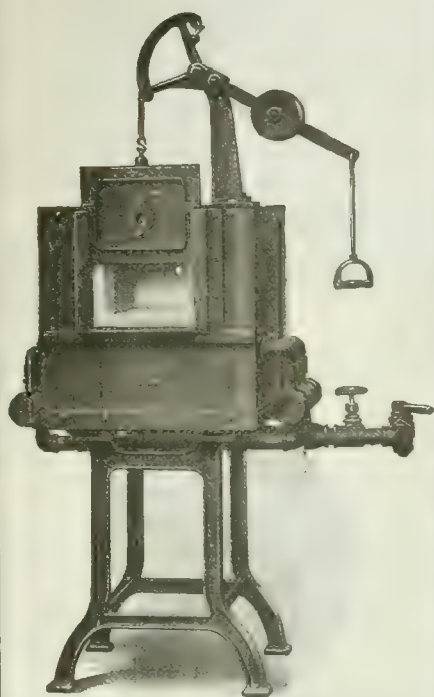
Annealing
Carbonizing
Hardening
High Speed Steel
Lead and Salt
Oil Tempering
Forging
Riveting

Toronto Office:

STANDARD FUEL ENGINEERING CO.

W. H. KIRK, Manager
909 Excelsior Life Building
Phone: Main 385





TYPE K HIGH SPEED
STEEL FURNACE

The Right Furnace for High Speed Steel

Too much—too little or an uneven heat treatment of High Speed Steel renders it practically worthless for the purpose intended.

This Gilbert & Barker furnace has been designed especially for the correct heat treatment of High Speed Steel. A temperature of 2400°F. is quickly obtained and easily maintained. The heat is uniform on all sides of the work and loss by radiation is reduced to the minimum by special insulation.

More than 50 years' experience in designing and building furnaces, especially for the accurate and economical heat treatment of metals is your guarantee of satisfaction.

PROMPT DELIVERY ON G. & B. FURNACES

Recent additions to our plant, already one of the largest in this field, makes it possible to offer immediate shipment of your order.

Tell us your problem and we will tell you the type of furnace you require, but first send for Bulletin 24. To-day is a better day than to-morrow--write.

Gilbert & Barker Mfg. Co.

West Springfield, Mass., U.S.A.

Canadian Agents: Williams & Wilson,
Montreal, Que. New York Office,
26 Broadway.



Do These Advantages Appeal

To Your Sense of Economy and Efficiency?

It's economy — requires one-half the space; costs less than half; no chimneys or flues required; instantaneous and perfect control of temperature; higher temperature obtained; no coal ash handlers required; no coal or ash piles; less waste of fuel, because it is shut off instantly; requires much less time to get the required heat. *Can you afford to lose the Advantages of this oil Furnace?*

OIL FURNACE

VERSUS

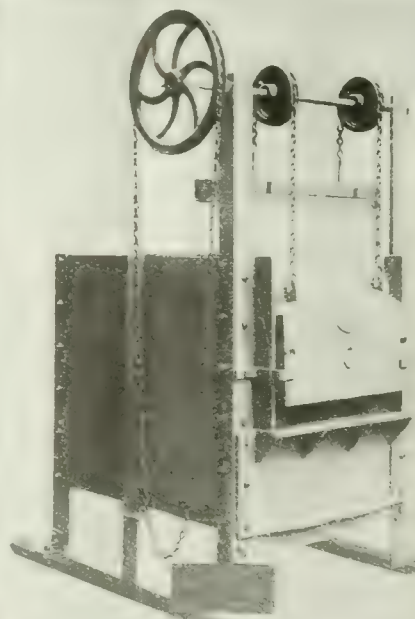
COAL FURNACE

Write To-day for Full Particulars.

Mechanical Engineering Company, Limited

Three Rivers, Que., Can.

Cable Address: "Mecol"





"After the Fire"

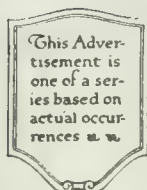
"OAKITE saved these brass parts from the scrap pile.

"When the shop burned down, these parts were in the hottest part of the fire. The oil was baked on to them so hard that we could not remove it by scrubbing or soaking in all kinds of acids.

"And just when we were ready to scrap them, one of those Oakite men came in here, and said he could clean them with Oakite.

"And he did.

"Just look at those parts now—good as new!"



OAKITE MANUFACTURED BY
OAKLEY CHEMICAL CO.
44 THAMES STREET · NEW YORK

ANGULAR GRIT

**Saves Labor
Saves Time
Saves Costs**

One ton of
Angular Grit
equal carloads
of sand

**Quicker
and
Better**

ANGULAR GRIT offers you the most advanced and economical method of cleaning castings, etc. Its angular and irregular cutting points clean raw castings and forgings more thoroughly and with greater speed than either sand or shot.

ANGULAR GRIT dispenses with sand bins and sand dryers, and there is no dust nuisance where it is used.

If you are using sand, think of the labor you can save by adopting ANGULAR GRIT in its place.

Used for all kinds of cleaning operations—best materials for cleaning shells. Prove its superiority by giving it a trial.

Pittsburgh Crushed Steel Co.

Established 1888

Pittsburgh, Pa., U.S.A.

Canadian Representatives:

Williams and Wilson Ltd., Montreal, P.Q.



Wire Cloth

of every description

We make Machinery Guards of all kinds.
Metal Lockers for Clothes.
Steel Shelving for all purposes.

Drop a line for full details

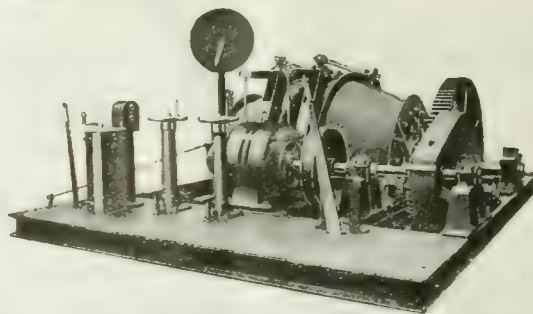
Canada Wire & Iron Goods Company
Hamilton Ontario
Eastern Representative:
H. E. O. Bull, 184 Mance
St., Montreal, Que

LANCASHIRE MOTORS

HAVE WORLD WIDE REPUTATION

FOR

"RELIABILITY"



MOTOR DRIVING MINE HOIST

**Specialists in Motor
Manufacture and Application**

SEND YOUR ENQUIRIES TO

**The Lancashire Dynamo & Motor Co.,
of Canada, Limited**

Head Office and Works
45 NIAGARA ST.
TORONTO

Branch Office
602 NEW BIRKS BLDG.
MONTREAL

At Your Service

Let Us Quote on Your Contract Work

Our Staff is always available for Consultation.

PATTERNS

CASTINGS

FORGINGS

And Machine Work of all Kinds

VICTORIA FOUNDRY CO., LIMITED
OTTAWA CANADA

PUNCH PRESS WORK

What Can You Save?

**By Using Parts Made in the
Punch Press**

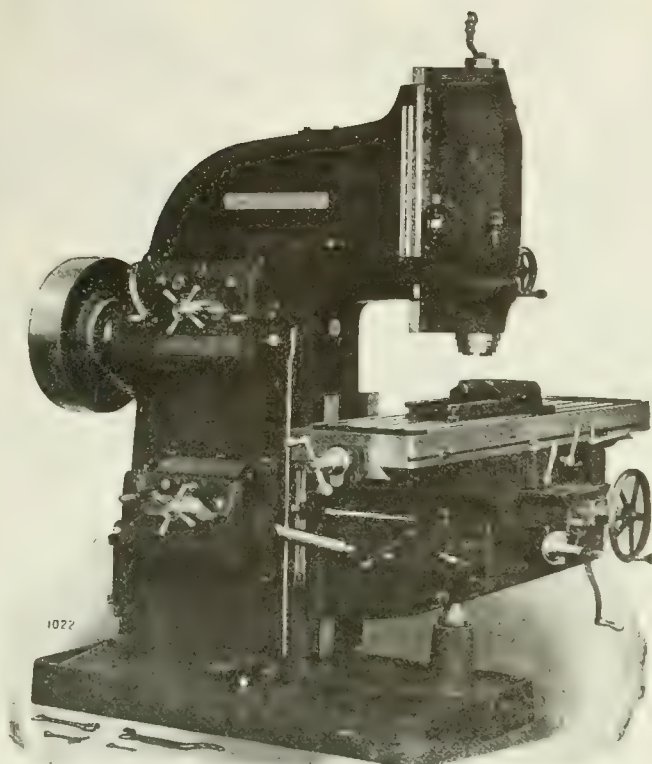
Look over your standard parts, Mr. Manufacturer, and see what parts can be made (or could be made by slight change in design) by this process.

You will be surprised at the saving you can effect.

We make Blanking, Perforating, Drawing, Forming and all classes of dies and tools for plain or difficult stamping to suit the production required.

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HANDY-CAN MILL AROUND A
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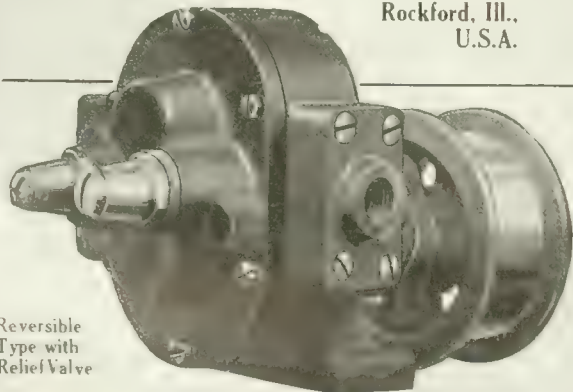
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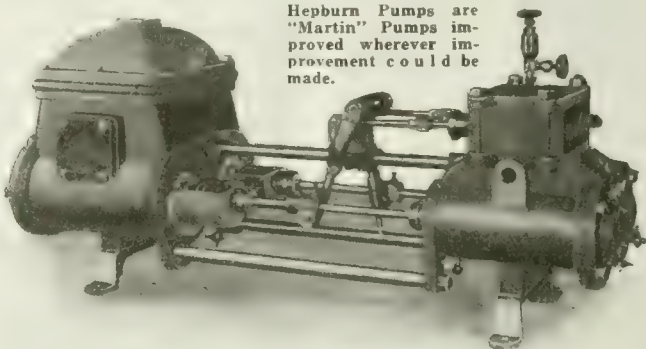


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Type with
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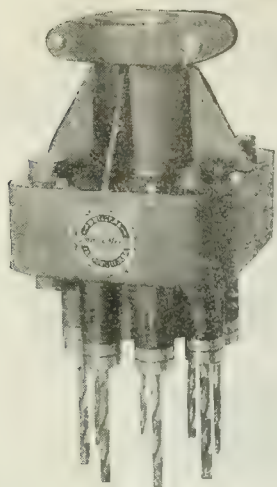


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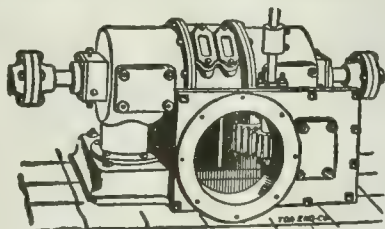
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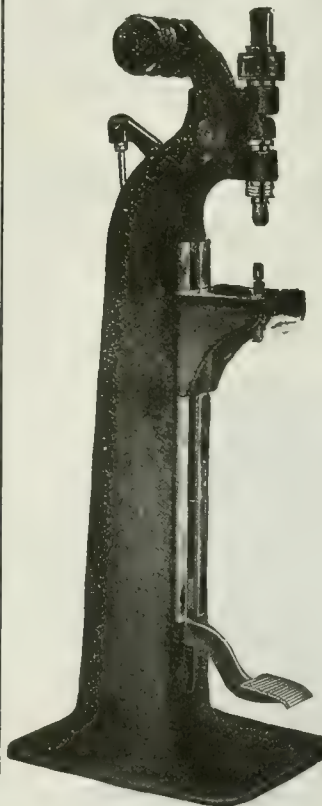
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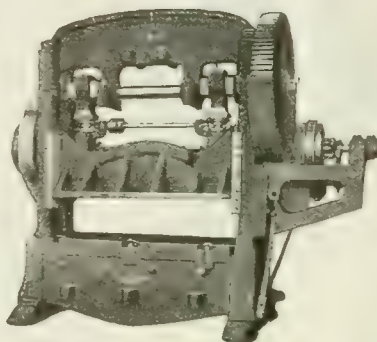
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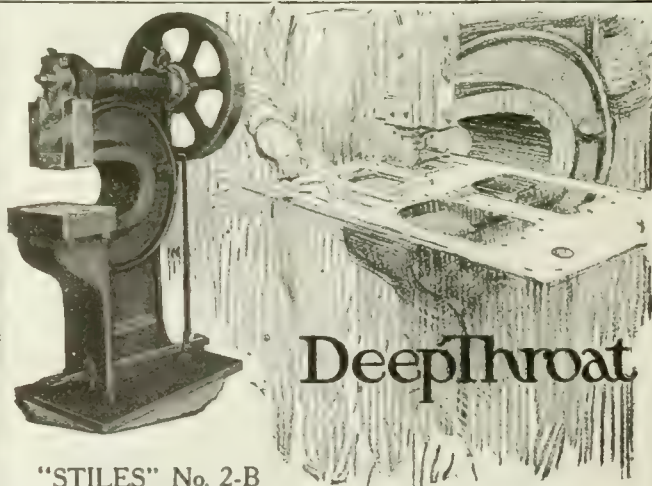


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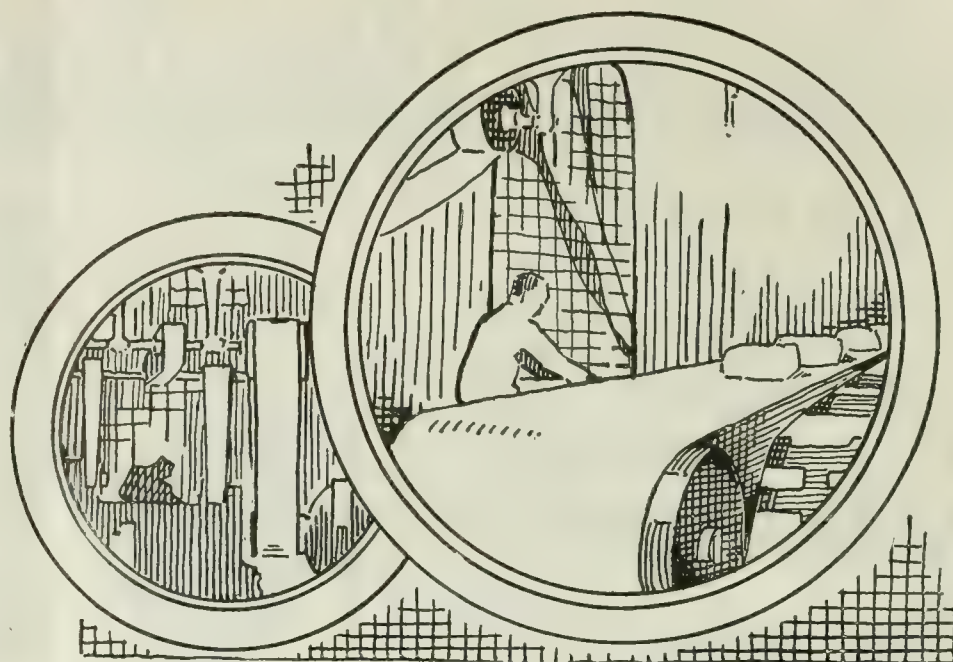
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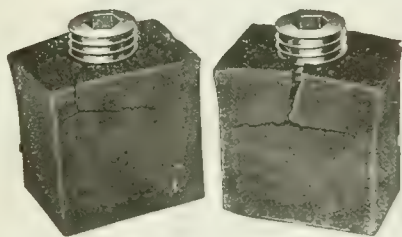
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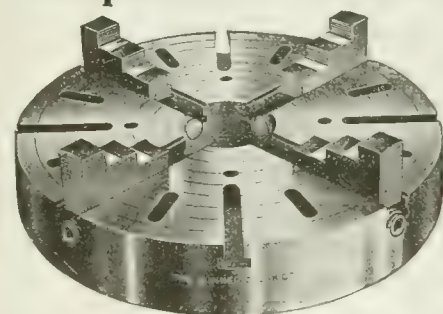
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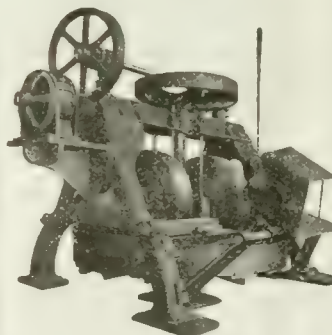
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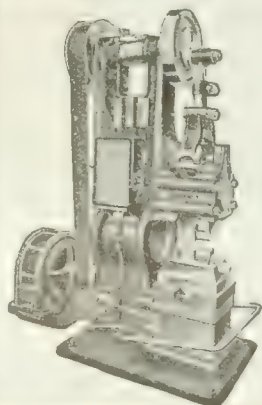
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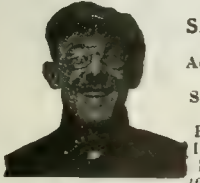


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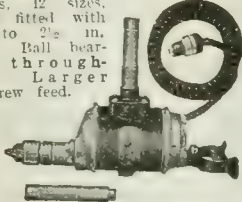
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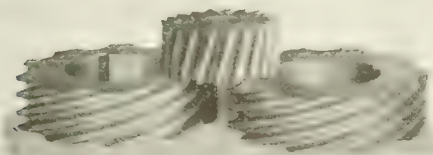
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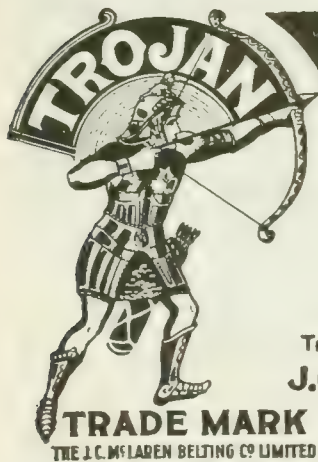
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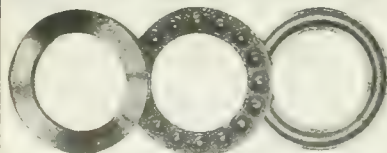


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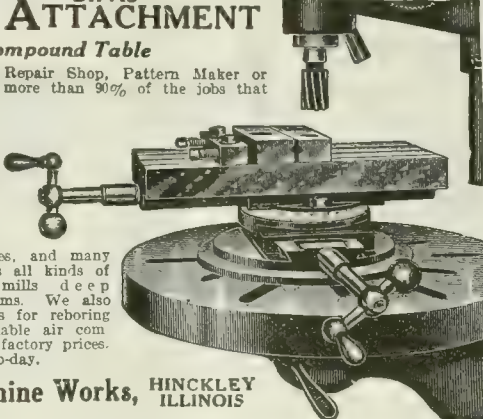
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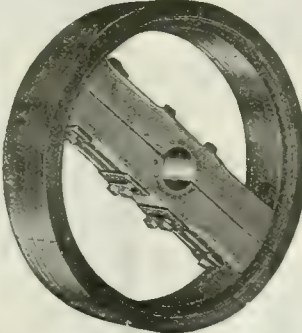
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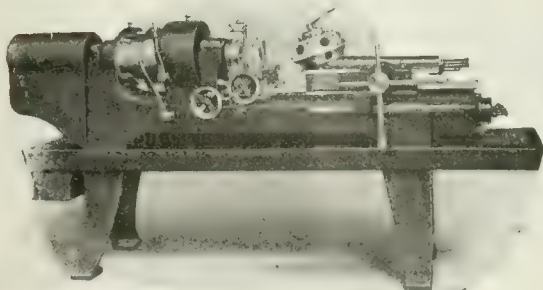
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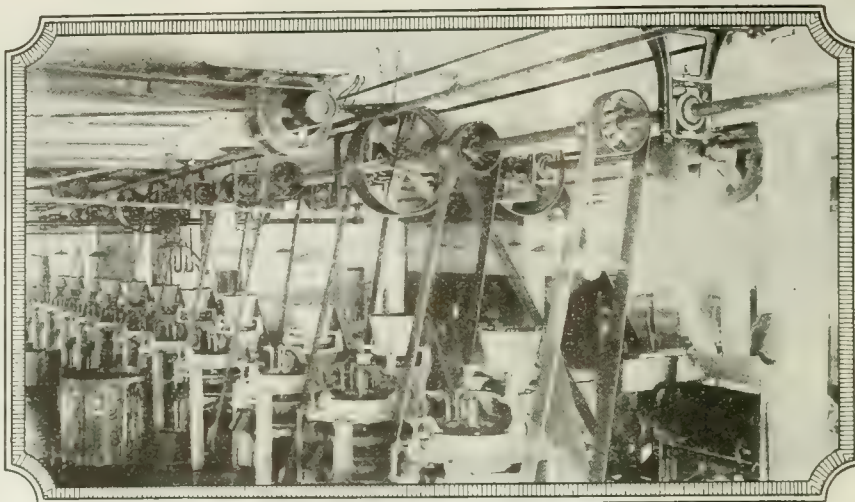
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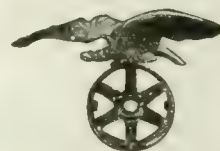
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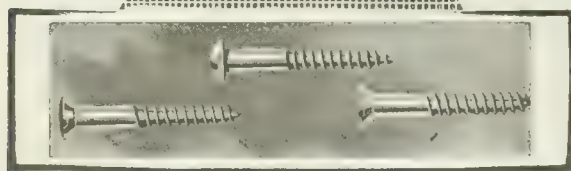
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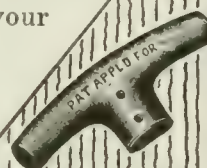
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Ford-Smith Machine Co., Hamilton, Ont.
J. C. Wilson & Co., Belleville, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Limited, Montreal, Que.

ARCHITECTURAL IRON

Pace Steel & Wire Co., Adrian, Mich.

ARRESTERS, DUST

Northern Crane Co., Walkerville, Ont.
Sheldons Ltd., Galt, Ont.
Pangborn Corporation, Hagerstown, Md.

AUTOGENOUS WELDING AND CUTTING PLANTS

Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.

AUTOMATIC MACHINERY

Baird Machine Co., Bridgeport, Conn.
Garlock-Walker Machinery Co., Toronto, Ont.
Gardner, Robt., & Son, Montreal, Ont.
National Acme Co., Cleveland, O., and Windsor.
Pratt & Whitney Co., Dundas, Ont.
Roxeford Machine & Tool Co., Toronto, Can.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson Ltd., Montreal, Que.

AUTOMATIC METAL CUTTING-OFF MACHINES

Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.
Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Canada Metal Co., Toronto.
The Geo. F. Foss Mch. & Supply Co., Montreal

AUTO SHEET METAL MACHINERY

Quickwork Co., St. Marys, Ohio

BABBITT METAL

Hoyt Metal Co., Toronto.
Magnolia Metal Co., Montreal.
Rice, Lewis & Son, Toronto, Ont.
Talmann Brass & Metal Co., Hamilton.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Limited, Montreal, Que.

BALL BEARINGS

Canadian Fairbanks-Morse Co., Montreal.
Can. S K F Co., Toronto, Ont.
Chapman Double Ball Bearing Company, Toronto
Rochester Ball Bearing Co., Rochester, N.Y.
Williams & Wilson, Limited, Montreal, Que.

BALLS, STEEL

Morse & Co., Inc., Montreal, Que.
Williams & Wilson, Limited, Montreal, Que.

BAROMETERS

Taylor Instrument Co., Rochester, N.Y.

BARRELS, SAND-BLAST

Pangborn Corporation, Hagerstown, Md.

BARRELS, STEEL SHOP

Baird Machine Co., Bridgeport, Conn.
Cleveland Wire Spring Co., Cleveland.

BARRELS, TUMBLING

Baird Machine Co., Bridgeport, Conn.
Katie Foundry, Galt, Ont.
Northern Crane Works, Walkerville, Ont.
Wilson & Co., J. C., Belleville, Ont.
Whitney Foundry Equipment Co., Harvey, Ill.
Williams & Wilson, Limited, Montreal, Que.

BASE FACING MACHINES

Victoria Foundry Co., Ottawa, Ont.

BARS, BORING

Gisholt Machine Co., Madison, Wis.
Niles-Bement-Pond Co., New York.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Limited, Montreal, Que.

BARS, MERCHANT

Algoma Steel Corp., Sault Ste. Marie, Ont.

BARS, CONCRETE REINFORCING

Algoma Steel Corp., Sault Ste. Marie, Ont.

BEADING MACHINES

Quickwork Co., St. Marys, Ohio.

BELT CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Williams & Wilson, Limited, Montreal, Que.

BEARINGS, BRONZE

Wilson & Co., J. C., Belleville, Ont.
Wentworth Mfg. Co., Hamilton, Ont.

BEARINGS, DIE CAST

Franklin Mfg. Co., Syracuse, N.Y.

BEARINGS, HIGH SPEED, OR HEAVY DUTY BRONZE

Wentworth Mfg. Co., Hamilton, Ont.

BELT LACERS

Clipper Belt Lacer Co., Grand Rapids, Mich.

BELT LACING LEATHER

Aikenhead Hardware Co., Toronto, Ont.
Foss Mch. & Supply Co., The Geo. F., Montreal

Graton & Knight Mfg. Co., Worcester, Mass.
Rice, Lewis & Son, Toronto, Ont.

BELTING, BALATA

Baxter & Co., Ltd., J. R., Montreal, Que.

Federal Engineering Co., Toronto, Ont.

BELTING, RUBBER

Can. Consolidated Rubber Co., Ltd., Montreal.

Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, CHAIN

Canadian Fairbanks-Morse Co., Montreal.

Can. Link-Belt Co., Toronto, Ont.

Jones & Glasco, Montreal, Que.

Morse Chain Co., Ithaca, N.Y.

Whitney Mfg. Co., Hartford, Conn.

Williams & Wilson, Limited, Montreal, Que.

BELTING, CONVEYOR

Can. Consolidated Rubber Co., Ltd., Montreal.

Baxter & Co., Ltd., J. R., Montreal, Que.

Canadian Fairbanks-Morse Co., Montreal.

Federal Engineering Co., Ltd., Toronto, Ont.

Graton & Knight Mfg. Co., Worcester, Mass.

Jones & Glasco, Montreal, Que.

McLaren, J. C., Belting Co., Montreal, Que.

Morse Chain Co., Ithaca, N.Y.

Plewes, Ltd., Winnipeg, Man.

Rice, Lewis & Son, Toronto, Ont.

Swedish Steel & Supplies Ltd., Montreal, Que.

Williams & Wilson, Limited, Montreal, Que.

BELTING, FRICTION AND SURFACE

Can. Consolidated Rubber Co., Ltd., Montreal.

BELTING, LEATHER

Can. Graton & Knight Mfg. Co., Montreal, Que.

Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, STITCHED COTTON DUCK

Dominion Belting Co., Hamilton Ont.

Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, WOVEN

Baxter & Co., Ltd., J. R., Montreal, Que.

Federal Engineering Co., Ltd., Toronto, Ont.

BENCH LEGS, STEEL

New Britain Mach. Co., New Britain, Conn.

BENCH DRAWERS, FRICTIONLESS

New Britain Mach. Co., New Britain, Conn.

BENDING ROLLS (PLUTE & AUGH)

Wickes Bros., Saginaw, Mich.

BENDING MACHINERY

Bertram & Sons Co., John, Dundas.
Bertrams, Limited, Edinburgh, Scotland.
Brown-Boggs Co., Ltd., Hamilton, Can.
Can. Blower & Forge Co., Kitchener, Canada.
Garlock-Walker Machinery Co., Toronto, Ont.
Williams & Wilson, Limited, Montreal, Que.

BLASTING MACHINES, SAND

Ferracute Mach. Co., Bridgeton, N.J.
Garlock-Walker Machinery Co., Toronto, Ont.
Jardine, A. B., & Co., Hespeler, Ont.
National Machinery Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York.
Toronto Machine & Tool Co., Toronto, Ohio.
Williams & Wilson, Limited, Montreal, Que.

BILLET MARKERS

Matthews & Co., Jas. H., Pittsburgh, Pa.

BILLETS

Swedish Steel & Importing Co., Ltd., Montreal.
Algoma Steel Corp., Sault Ste. Marie, Ont.
Kaysor-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

BILLETS, FORGING

General Steel Co., Milwaukee, Wis.
Kaysor-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

BINS, STEEL

Dennis Wire & Iron Works, London, Ont.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Toronto Iron Works, Ltd., Toronto, Ont.

BLASTING MACHINES, SHOT AND STEEL GRIT

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

BLOOMS AND SLABS

Algoma Steel Corp., Sault Ste. Marie, Ont.

BLOWERS

Can. Blower & Forge Co., Kitchener, Ont.
Sheldons Ltd., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
MacGovern & Co., Montreal, Que.
Williams & Wilson, Limited, Montreal, Que.

BLOW PIPES AND REGULATORS

Carter Welding Co., Toronto, Ont.

Prest-O-Lite Co., Inc., Toronto, Ont.

BLUE PRINTING MACHINERY

Commercial Camera Co., Province, R.I.
Mulliner-Edlund Tool Co., Syracuse, N.Y.

BOARDS, GLASS CUTTING

Lufkin Rule Co. of Can., Windsor, Ont.

BOATIZ

Anderson & Co. of Canada, Geo., Montreal, Que.

Joyce, Koebel & Co., Inc., New York.

BOLT CUTTERS

Greenfield Tap & Die Corp., Greenfield, Mass.

Wells Bros. of Can., Galt, Ont.

Williams & Wilson, Limited, Montreal, Que.

BOOKS, TECHNICAL

MacLean Publishing Co., Toronto.

BOILERS

Dominion Bridge Co., Montreal, Quebec.

MacGovern & Co., Montreal, Que.

MacKinnon Steel Co., Sherbrooke, Que.

Riverside Machinery Depot, Detroit, Mich.

BOLT CUTTERS AND NUT TAPERS

Aikenhead Hardware Co., Toronto, Ont.

Canadian Machinery Corp., Galt, Ont.

Garlock-Walker Machinery Co., Toronto, Ont.

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Landis Machine Co., Weymouth, Pa.

Rice, Lewis & Son, Toronto, Ont.

Wells Brothers Co. of Canada Galt, Ont.

Williams & Wilson, Limited, Montreal, Que.

BOLTS

Aikenhead Hardware Co., Toronto, Ont.

London Bolt & Hinge Works, London, Ont.

Rice, Lewis & Son, Toronto, Ont.

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

Steel Co. of Canada, Ltd., Hamilton, Ont.

United Brass & Lead, Ltd., Toronto.

Wilkinson & Kompass, Hamilton, Ont.

Williams & Co., J. H., Brooklyn, N.Y.

BOLTS, SPRING SHAKE

Can. Winkley Co., Ltd., Windsor, Ont.

BOLT AND NUT MACHINERY

Bertram & Sons Co., John, Dundas.

Canada Machinery Corp., Galt, Ont.

Garlock-Walker Machinery Co., Toronto, Ont.

Gardner & Son, Robt., Montreal.

Landis Machine Co., Weymouth, Pa.

National Machinery Co., Tiffin, Ohio.

Riverside Machinery Depot, Detroit, Mich.

Williams & Wilson Ltd., Montreal, Ont.

Williams Machinery Co., A. R., Toronto.

BOLT THREADING MACHINERY

Jardine & Co., Ltd., A. B., Hespeier, Ont.
Lancis Machine Co., Wayneboro, Pa.
National Acme Co., Cleveland, Ohio.
Victor Tool Co., Wayneboro, Pa.
Williams & Wilson, Limited, Montreal, Que.

BORING MACHINES, PNEUMATIC CYLINDER

Cleveland Pneumatic Tool Co. of Canada, Toronto
Canadian Fairbanks-Morse Co., Montreal
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Machinery Co., Toronto, Ont.

BORING MACHINES, UPRIGHT AND HORIZONTAL

Bertram & Sons Co., John, Dundas.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Giddings & Lewis Mfg. Co., Fond du Lac, Wis.
Gisholt Machine Co., Madison, Wis.
Lancis Tool Co., Wayneboro, Pa.
Niles-Bement-Pond Co., New York.
Roelofson Machine & Tool Co., Toronto, Ont.
Williams & Wilson, Limited, Montreal, Que.

BORING AND TURNING MILLS

Bertram & Sons Co., John, Dundas.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Gisholt Machine Co., Madison, Wis.
Foss Mch. & Supply Co., The Geo. F., Montreal.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal, Que.

BOARDS, STEEL SHOP AND TOTE

Cleveland Wire Spring Co., Cleveland, Ohio.
New Britain Mach. Co., New Britain, Conn.

BRAKEBAND LINING CUTTERS

Peck, Stow & Wilcox Co., Southington, Conn.

BRACKES

Brown, Boggs & Co., Hamilton, Can.
Electric Steel & Metals, Ltd., Welland, Ont.

BRASS AND COPPER BARS, RODS

Peck, Stow & Wilcox Co., Southington, Conn.

BRACKES, CORNICE

Peck, Stow & Wilcox Co., Southington, Conn.

AND SHEETS

Brown's Copper & Brass Rolling Mills, New Toronto.

TALLMAN BRASS & METAL CO., HAMILTON, ONT.

Canada Metal Co., Toronto.
Greenleafs, Ltd., Belleville, Ont.
St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton, Ont.
United Brass & Lead Ltd., Toronto.
Wilson & Co., J. C., Belleville, Ont.

BRASS WORKING MACHINERY

Forster Machine Co., Elkhart, Ind.
Garlock-Walker Machinery Co., Toronto, Ont.
Warner & Swasey Co., Cleveland.
Niles-Bement-Pond Co., New York.
Prest-O-Lite Co. Inc., Toronto, Ont.
Wood Turret Machine Co., Brazil, Ind.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

BRICKS, FI E

Harbison-Walker Refractories Co. of Canada, Montreal, Que.

BRIDGES, RAILWAY AND HIGHWAY

Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

BROWN RODS AND SHEETS, PLATES

Brown's Copper & Brass Rolling Mills, New Toronto.

BROWN, NAVAL

Brown's Copper & Brass Rolling Mills, New Toronto.

CANADA METAL CO., TORONTO.

Tallman Brass and Metal Co., Hamilton, Ont.
United Brass & Lead Ltd., Toronto.

BRONZE, COPPER

Canada Metal Co., Toronto.

BUFFING AND POLISHING MACHINERY

Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mch. & Supply Co., The Geo. F., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
New Britain Machine Co., New Britain, Conn.
Williams & Wilson, Limited, Montreal, Que.

BUCKETS, DUMP

MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

BUCKETS, ELEVATOR

Can. Link-Belt Co., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

BUCKETS, CLAM SHELL, CRAB, DUMP

Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Ltd., Walkerville, Ont.

BUILDERS

Bertram & Sons Co., John, Dundas.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Williams & Wilson, Limited, Montreal, Que.

BURNERS, OIL AND NATURAL GAS

Northern Crane Works, Ltd., Walkerville, Ont.

BURRS, IRON AND COPPER

Parmenter & Bullock Co., Gananoque, Ont.

BUSHINGS, BRONZE

Oberlander Brass Co., M. L., Syracuse, N.Y.

CALIPERS

Peck, Stow & Wilcox Co., Southington, Conn.

CABINETS, SAND BLAST

Panthers Corporation, Hagerstown, Md.

CAIKS, BOOT

Luffkin Rule Co. of Can., Windsor, Ont.

CANADA SILVER SHEETS, ROLLS

Brown's Copper & Brass Rolling Mills, New Toronto.

CANNERS' MACHINERY

Rita E. W. Co., Brooklyn, N.Y.
Ferrante Mach. Co., Ridgeway, N.J.
Brown Bros & Co., Hamilton, Can.

CANNERS' CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Wilson & Co., J. C., Belleville, Ont.

CARBONIZING BOXES

Katie Foundry, Galt, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

SWEDISH CRUCIBLE STEEL CO., WINDSOR, ONT.

CARRIERS, PNEUMATIC TUBE

Jones & Glasco, Montreal.

CARS, INDUSTRIAL

Can. Blower & Forge Co., Kitchener, Can.
Canadian Fairbanks-Morse Co., Ltd., Montreal
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

SHEDLONS, LIMITED, GALT, ONT.

Whiting Foundry Equipment Co., Harvey, Ill.

CASTINGS, MACHINERY

Winnipeg Iron Foundry Co., Winnipeg.
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, ALUMINUM, BRASS

BRONZE, COPPER AND GUN METAL

Algoma Steel Corp., Sault Ste. Marie, Ont.
Franklin Mfg. Co., Syracuse, N.Y.

CASTINGS, DIE CAST

Franklin Mfg. Co., Syracuse, N.Y.
Wentworth Mfg. Co., Hamilton, Ont.

CARRIERS

Alexander Fleck, Ltd., Ottawa.
Greenleafs, Ltd., Belleville, Ont.
Oberlander Brass Co., M. L., Syracuse, N.Y.
St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton, Ont.
United Brass & Lead Ltd., Toronto.

CASTINGS, BRASS AND IRON

Algoma Steel Corp., Sault Ste. Marie, Ont.

CASTINGS, BUILDING

Katie Foundry, Galt, Ont.

CASTINGS, GRAY IRON

Bernard Industrial Co., The A., Fortierville, Que.
Brown, Boggs Co., Ltd., Hamilton, Can.
Alexander Fleck, Ltd., Ottawa.
Gardner & Son, Robt., Montreal.
Greenleafs, Ltd., Belleville, Ont.

Hull Iron & Steel Foundries, Ltd., Hull, Que.
International Malleable Iron Co., Guelph, Ont.
Kennedy & Sons, Ltd., Wm., Owen Sound.
Katie Foundry, Ltd., Galt, Ont.
Plessisville Foundry Co., Plessisville, Que.
Sheldons, Limited, Galt, Ont.
Fittings, Ltd., Oshawa, Ont.
Hamilton Co., Wm., Peterboro.

CASTINGS, PLUMBERS

Katie Foundry, Galt, Ont.

CASTINGS, NICHROME

Can. Driver-Harris Co., Walkerville, Can.

CASTINGS, HARDWARE

Katie Foundry, Galt, Ont.

CASTINGS, STEEL CHROME AND MANGANESE STEEL

Thos. Davidson Mfg. Co., Montreal, Que.
Dominion Foundries & Steel, Ltd., Hamilton, Ont.
Hull Iron & Steel Foundries, Ltd., Hull, Que.
Kennedy & Sons, Ltd., Owen Sound.

CASTINGS, MALLEABLE

Fittings, Ltd., Oshawa, Ont.
International Malleable Iron Co. Guelph, Ont.

CASTINGS, NICKEL STEEL

Hull Iron & Steel Foundries, Ltd., Hull, Que.

CEMENT MACHINERY

Canadian Fairbanks-Morse Co., Ltd., Montreal.
Gardner, Robt. & Son, Montreal.

CEMENT HANDLING MACHINERY

Can. Link-Belt Co., Toronto, Ont.

CENTERING MACHINES

Victoria Foundry Co., Ottawa, Ont.

CENTRE REAMERS

Bertram & Sons Co., John, Dundas.
Gardner, Robt. & Son, Montreal.
Hoffmrt, Rogers Mach. Co., South Sandbury, Mass.
Niles-Bement-Pond Co., New York.
Prest & Whitney Co., Dundas, Ont.
Wells Bros. Co. of Canada, Galt, Ont.

CHAIN, WELDED COIL

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

CHAIN BLOCKS

Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Ltd., Montreal.
Ford Chain Block & Mfg. Co., Philadelphia, Pa.
Garlock-Walker Machy. Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

PIERCE LEWIS & SON TORONTO, ONT.

Williams & Wilson, Limited, Montreal, Que.
Wright Mfg. Co., Lisbon, Ohio.

CHAIN LINKS, DETACHABLE

Fittings, Ltd., Oshawa, Ont.

CHAINS, FOR ELEVATORS AND CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson, Limited, Montreal, Que.

CHAIN, MALLEABLE, DETACHABLE AND RIVETED

Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson, Limited, Montreal, Que.

CHAIN DRIVES

Can. Link-Belt Co., Toronto, Ont.
Coventry Chain Co., Coventry, England.
Jones & Glasco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.

CHASERS

National Acme Co., Cleveland, Ohio.
Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.

CHEMISTS

Toronto Testing Laboratory, Ltd., Toronto.

CHROME VANADIUM STEEL

J. F. A. Comstedt, New York City, N.Y.
General Steel Co., Milwaukee, Wis.
Kaysor-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

CHROME NICKEL STEEL

J. F. A. Comstedt, New York City, N.Y.
General Steel Co., Milwaukee, Wis.
Kaysor-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

CHUCKS, AERO, AUTOMATIC

Garrin Machine Co., New York.

CHUCKS, COLLET, AIR

Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Smalley-General Co., Inc., Bay City, Mich.
Williams & Wilson, Limited, Montreal, Que.

CHUCKS, DRILL, LATHE AND UNIVERSAL

Aikenhead Hardware Co., Toronto, Ont.
Almond Mfg. Co., T. R., Ashburnham, Mass.
Emmery & Sons Co., John, Dundas.
Can. Blower & Forge Co., Kitchener, Canada
Canadian Fairbanks-Morse Co., Ltd., Montreal
Cushman Chuck Co., Hartford, Conn.
Foss Mch. & Supply Co., The Geo. F., Montreal
Gardner, Robt., & Son, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Chicago, Ill.
Jacobs Mfg. Co., Hartford, Conn.
Ker & Goodwin, Bradford.
Knight Metal Products, Ltd., Toronto, Ont.
Modern Tool Co., Erie, Pa.
Rice, Lewis & Son, Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
Whiton Machine Co., D. E., New London, Conn.
Williams & Wilson, Limited, Montreal, Que.

CHUCKS, DRILL, AUTOMATIC AND KEYLESS

Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener, Canada
Whitney Mfg. Co., Hartford, Conn.

CHUCKS, FRICTION AND TAP

Victor Tool Co., Wayneboro, Pa.
Wells Bros. Co. of Canada, Galt, Ont.

CHUCKS, MAGNETIC

Heald Machine Co., Worcester, Mass.
Williams & Wilson, Limited, Montreal, Que.

CHUCKS, RING WHEEL

Ford-Smith Mach. Co., Hamilton, Ont.
Gardner Machine Co., Beloit, Wis.

CHUCKS, WRENCH

Thomas Elevator Co., Chicago, Ill.

CHUCKING MACHINES

Garrin Machine Co., New York.
Gisholt Machine Co., Madison, Wis.
New Britain Machine Co., New Britain, Conn.
National Acme Co., Windsor, Vt.
Niles-Bement-Pond Co., New York.
Roelofson Machine & Tool Co., Toronto, Ont.
Warner & Swasey Co., Cleveland, O.
Wood Turret Mach. Co., Brazil, Ind., U.S.A.
Williams & Wilson, Limited, Montreal, Que.

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Williams & Co., J. H., Brooklyn, N.Y.

CLEANING COMPOUND

Oakley Chemical Co., New York.

CLOCKS, WATCHMAN, PORTABLE

Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Inc., Chicago, Ill.

CLUTCHES, CHAIN

Jones & Glasco, Montreal, Que.

CLUTCHES, FRICTION AND PULLEY

Bernard Industrial Co., A., Fortierville, Que.
Can. Link-Belt Co., Toronto, Ont.
Carlyle Johnson Mach. Co., Manchester, Conn.
Jones & Glasco, Montreal, Que.
Positive Clutch & Pulley Works, Ltd., Toronto
Williams & Wilson, Limited, Montreal, Que.

COAL HANDLING MACHINERY

Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Marsh Engineering Works, Ltd., Belleville, Ont.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

Northern Crane Works, Ltd., Walkerville, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Williams & Wilson, Limited, Montreal, Que.

COILING MACHINERY, WIRE AND SPRING

Garlock-Walker Machinery Co., Toronto, Ont.
Sleeper & Hartley, Inc., Worcester, Mass.

COKE AND COAL

Hanna & Co., M. A., Cleveland, O.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

COKE AND COAL HANDLING EQUIPMENT

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

COLLARS, SHAFTING

Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Limited, Montreal, Que.

COLLECTORS, PNEUMATIC

Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Limited, Galt, Ont.
J. C. Wilson & Co., Belleville, Ont.

COLLETS

Recker Milling Machine Co., Boston, Mass.
Hardinge Bros., Inc., Chicago, Ill.
Wilson & Co., J. C., Belleville, Ont.

COMPOSITION INGOT

Brown's Copper & Brass Rolling Mills, New Toronto.

CANADA METAL CO., TORONTO, ONT.

United Brass & Lead Ltd., Toronto.

COMBINED OPEN SIDE PLANNER-SHAPER

Lynd-Farnham Co., Boston, Mass.

COMPRESSORS, AIR

Can. Ingersoll-Rand Co., Sherbrooke, Que.
Cleveland Pneumatic Tool Co. of Canada, Toronto
Curtis Pneumatic Machy. Co., St. Louis, Mo.
Garlock-Walker Machinery Co., Toronto, Ont.
Hinckley Machine Co., Hinckley, Ill.
MacGovern & Co., Montreal, Que.
Williams & Wilson, Limited, Montreal, Que.

CONDENSERS

MacGovern & Co., Montreal, Que.
Smalley-General Co., Inc., Bay City, Mich.

Only a Drawing-in Bolt Required to Hold Arbors and Collets

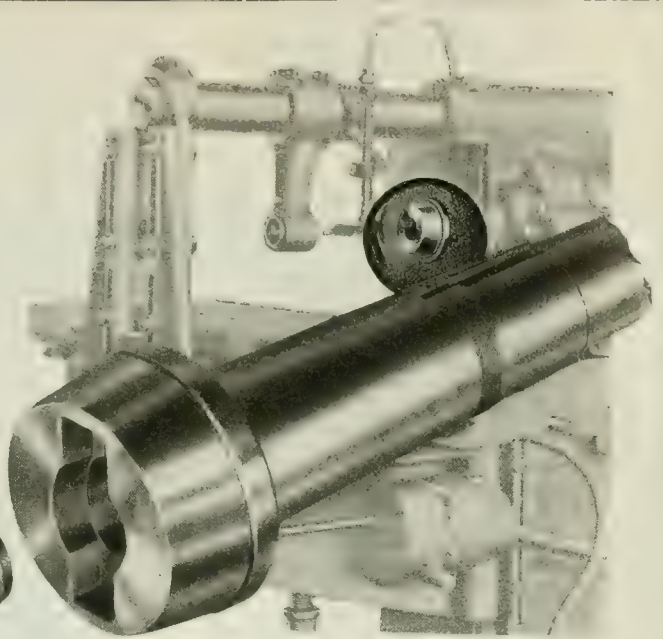
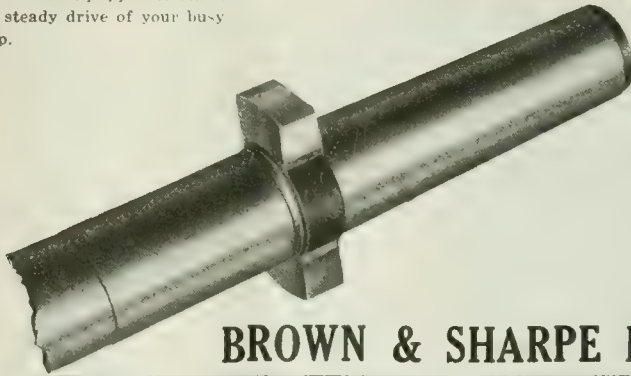
Clutch on arbor or collet fits recess in spindle and drawing-in bolt securely holds arbor or collet in place. This construction does away with plates, screws and loose parts; and as illustration shows

No Drive Could be More Positive

The spindles of Brown & Sharpe Milling Machines are but one of the many features of these easy-to-operate, productive machines. Let us tell you about them in detail. See for yourself why they are so well equipped to stand the steady drive of your busy shop.

All Brown & Sharpe arbors have a shank as large in diameter as the largest standard arbor of the same taper.

Nose of Spindle Free From Projecting Parts



Brown & Sharpe Mfg. Co.
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Mild Steel, High Carbon Steel, Manganese Steel, Chrome Steel

We are manufacturers of Steel Castings running from $\frac{1}{2}$ lb. to 5,000 lbs. each and are in good position to furnish prompt deliveries at moderate prices. Try us with your next order.

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Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

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Ranfield, W. H., & Sons, Toron. o.
Brown Engineering Corp., Toronto
Ford-Smith Machine Co., Hamilton, Ont.
Homer & Wilson, Hamilton, Ont.
Katie Foundry, Ltd., Galt, Ont.
Marten Machine Co., Hamilton, Ont.
St. Lawrence Welding Co., Montreal.
Victoria Foundry Co., Ottawa.
Wilson & Co., J. C., Belleville, Ont.
Welland Motor & Machine Co., Welland, Ont.
Windsor Mach. Tool Co., Windsor, Ont.

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Volta Mfg. Co., Welland, Ont.

CONTROLLERS AND STARTERS

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CONTROLLING INSTRUMENTS

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Pratt & Whitney Co., Dundas, Ont.

Rice, Lewis & Son, Toronto, Ont.

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Ford-Smith Machine Co., Hamilton, Ont.

Foster Machine Co., Elkhart, Ind.

Williams & Wilson, Limited, Montreal, Que.

COUPLINGS, FRICTION

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Gardner, Robt., & Son, Montreal.

Independent Pneumatic Tool Co., Chicago, Ill.

Wilson & Co., J. C., Belleville, Ont.

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Northern Crane Works, Walkerville

CUPS, OIL

Can. Winkley Co., Ltd., Windsor, Ont.

COVERS, OIL HOLE

Can. Winkley Co., Ltd., Windsor, Ont.

CRANES, GANTRY

Can. Link-Belt Co., Toronto, Ont.

Morris Crane & Hoist Co., Herbert, Niagara

Falls, Ont.

Northern Crane Works, Walkerville

CRANE RUNWAYS

MacKinnon Steel Co., Sherbrooke, Quebec.

CRANES, GOLIATH, PNEUMATIC AND PORTABLE

Morris Crane & Hoist Co., Herbert, Niagara

Falls, Ont.

Northern Crane Works, Walkerville.

Wilson & Co., J. C., Belleville, Ont.

Williams & Wilson, Limited, Montreal, Que.

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Can. Link-Belt Co., Toronto, Ont.

Curtis Pneumatic Machy. Co., St. Louis, Mo.

Dominion Bridge Co., Montreal.

Herburn, John T., Ltd., Toronto, Ont.

MacKinnon Steel Co., Sherbrooke, Quebec.

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

Morris Crane & Hoist Co., Herbert, Niagara

Falls, Ont.

Niles-Bement-Pond Co., New York

Northern Crane Works, Walkerville

CRANK SHAFTS

Canada Foundry & Forgings, Ltd., Welland, Ont.

Williams & Co., J. H., Brooklyn, N.Y.

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Can. Link-Belt Co., Toronto, Ont.

Morris Crane & Hoist Co., Herbert, Niagara

Falls, Ont.

Northern Crane Works, Walkerville.

Rice, Lewis & Son, Toronto, Ont.

J. C. Wilson & Co., Belleville, Ont.

Williams & Wilson, Limited, Montreal, Que.

CRIMPS, LEATHER

Graton & Knight Mfg. Co., Worcester, Mass.

CRUSHED STEEL

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

CUPOLAS

Can. Blower & Forge Co., Kitchener, Ont.

Northern Crane Works, Walkerville.

Sheldons, Ltd., Galt, Ont.

CUPOLA BLAST GAUGES AND BLOWERS

Sheldons, Ltd., Galt, Ont.

CURE PUMPS FOR OIL AND GASOLINE

Bosser & Co., S. F., Inc., Fort Wayne, Ind.

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Greenfield Tap & Die Corp., Greenfield, Mass.

Wells Bros. of Can., Galt, Ont.

Williams & Wilson, Limited, Montreal, Que.

CUTTERS, FLUE

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Canadian Fairbanks-Morse Co., Ltd., Montreal

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Foss Mch. & Supply Co., The Geo. F., Montreal.

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Garlock-Walker Machinery Co., Toronto, Ont.

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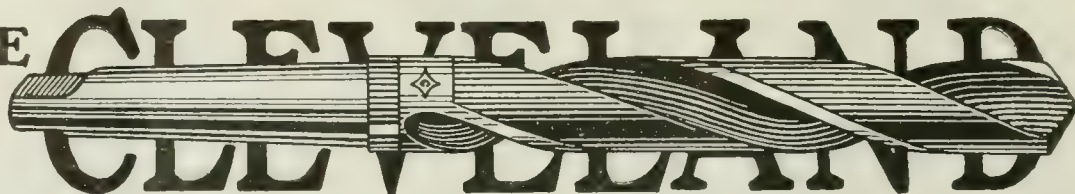
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Fry's (London), Ltd., London, England.
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Niles-Bement-Pond Co., New York.
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Reed Machine Co., Galt, Ont.

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Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.
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Whitman & Barnes Mfg. Co., St. Catharines, Ont.
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Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Limited, Montreal, Que.

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Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal, Que.

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Garlock-Walker Machinery Co., Toronto, Ont.
Independent Pneumatic Tool Co., Chicago, Ill.

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Garlock-Walker Machinery Co., Toronto, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
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Wilt Twist Drill Co. of Canada, Walkerville, Ont.

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Cleveland Pneumatic Tool Co. of Canada, Toronto.
The Geo. F. Foss Machy. & Supply Co., Montreal.
A. R. Williams Machy. Co., Toronto.

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Can. Blower & Forge Co., Kitchener, Ont.
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Rice Lewis & Son, Toronto, Ont.
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Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

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Bliss, E. W., Co., Brooklyn, N.Y.
Brown, Rogers Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
National Machinery Co., Tiffin, Ohio.
Williams & Wilson, Limited, Montreal, Que.

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Williams & Co., J. H., Brooklyn, N.Y.

FRICTION LEATHERS

Graton & Knight Mfg. Co., Montreal.

FRICTION SURFACE BELTING

Can. Consolidated Rubber Co., Ltd., Montreal.

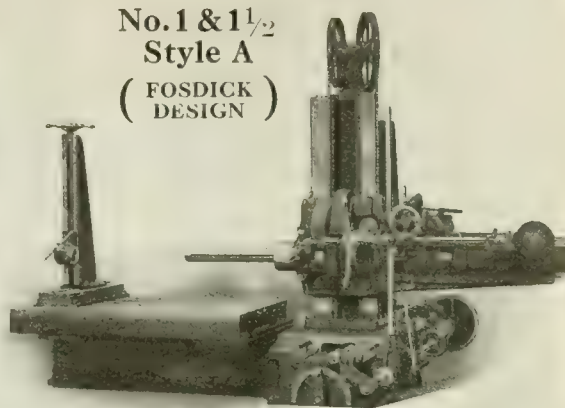
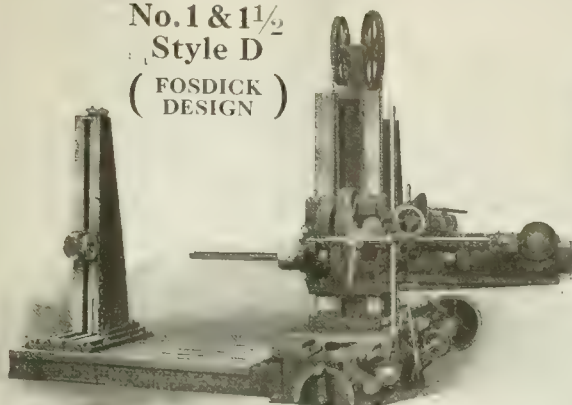
FUEL OIL SYSTEMS

Bowser & Co., S. F., Inc., Fort Wayne, Ind.
Gilbert & Barker Mfg. Co., Springfield, Mass.

**No. 1 & 1½
Style D
(FOSDICK
DESIGN)**



**No. 1 & 1½
Style A
(FOSDICK
DESIGN)**



<i>Size of Machine</i>	No. 1	No. 1½
Diameter of spindle	3½"	4"
Morse taper No.	5	6
Traverse of spindle	28"	30"
Vertical adjustment of head	30"	64"
Horizontal adjustment of column	30"	62"
Maximum work bed to center of spindle (Style D)	44"	62"
Size of work bed	42" x 72"	42" x 120"
<i>Size of Machine</i>	No. 1	No. 1½

Speeds (4 to 255 R.P.M. geometrical progression)	12	1.
Feeds, in all directions (.007 in. to ¼ in. per revolution)	8	8
Motor horse power	7½	10
Floor space	9' x 15'	11' x 19'
Total height of machine	8' 9"	10' 3"
Net weight (Style A machine)	15,000 lbs	21,000 lbs
Net weight (Style D machine)	15,000 lbs	19,500 lbs

G Boring, & and Drilling Milling

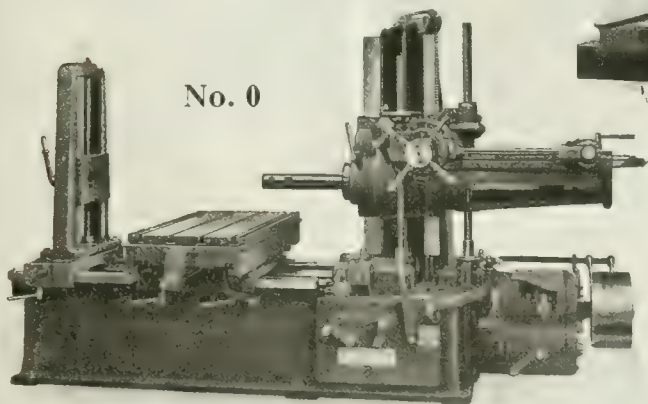
Machines

Built to handle those awkward, unwieldy pieces that are so troublesome to handle on other machines.

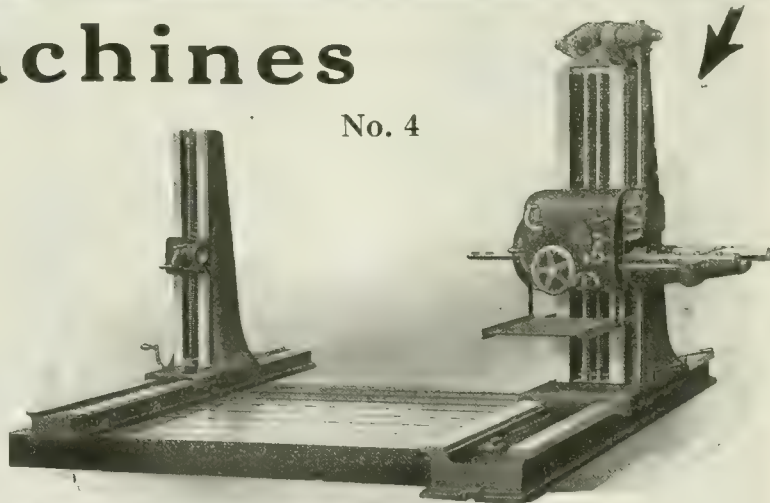
Their convenience, simplicity, easy control and great accuracy will prove invaluable to your plant.

Let us put some interesting facts before you. Write for full particulars now.

No. 0



No. 4



NO. "4" FOR BIG WORK

Diameter of spindle	5
Size of hole in spindle	No. 6 Morse
Size of floor plate	8' x 12'
Floor space required	16' x 24' 6"
Weight	50,000 lbs.

NO. "0" FOR PRECISION WORK

Diameter of spindle bar	3½ in.
Spindle bored to fit Morse Taper No.	5
Longitudinal travel of spindle	26 in.
Vertical adjustment of head on column	25½ in.
Size of table	24 in x 60 in.
Traverse travel of table	30 in.
Longitudinal travel of table	32 in.
Approximate net weight	9,500 lbs.

Drop us a line for detailed information and catalogue.

Giddings & Lewis Manufacturing Company, Fond Du Lac, Wis.

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Gilbert & Barker Mfg. Co., Springfield, Mass.
Mechanical Engineering Co., Three Rivers, Que.
Standard Fuel Engr. Co., Detroit, Mich.
Williams & Wilson, Limited, Montreal, Que.

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Toronto Iron Works, Ltd., Toronto.

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Standard Fuel Engineering Co., Detroit, Mich.

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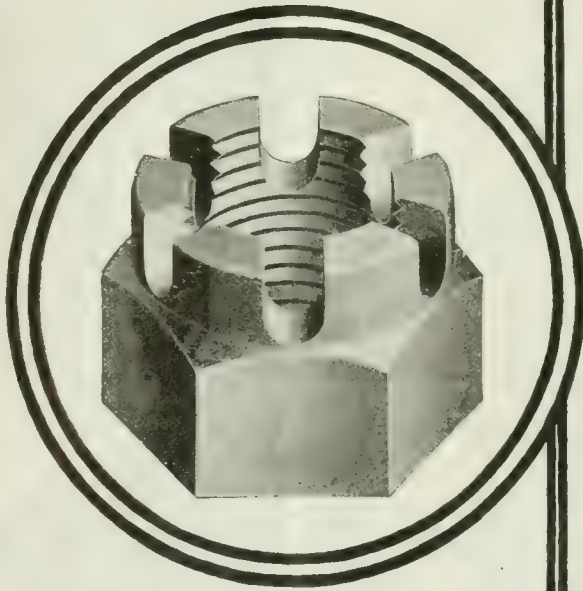
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Garvin Machine Co., New York.
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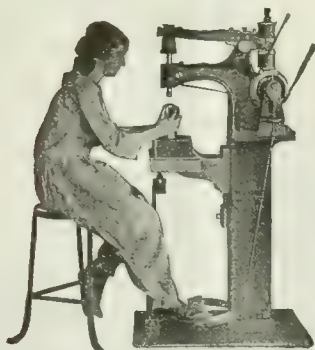
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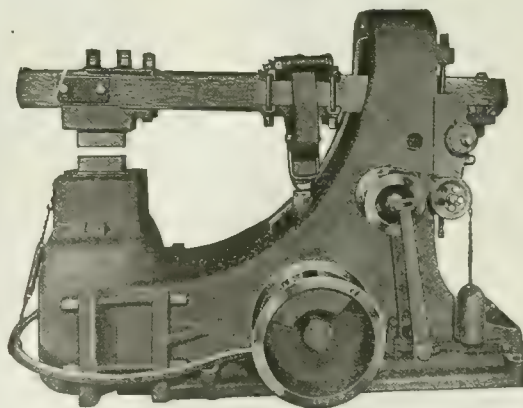
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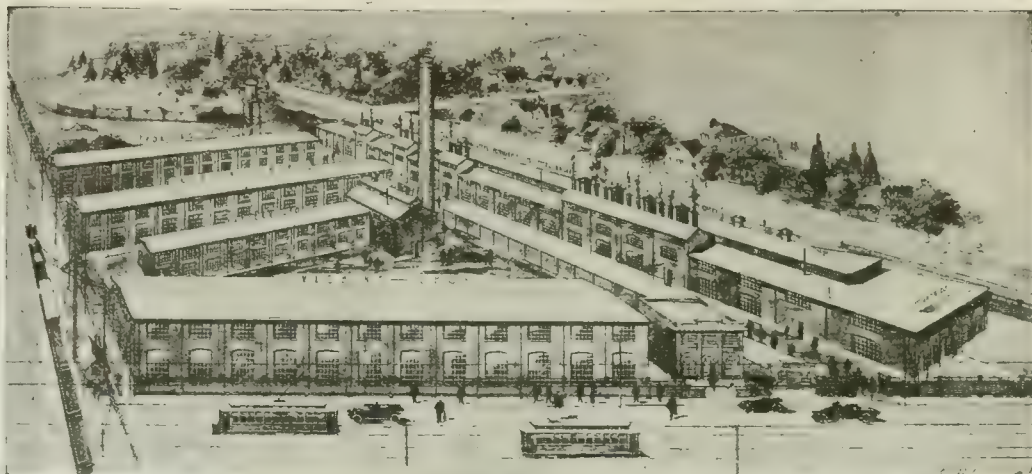
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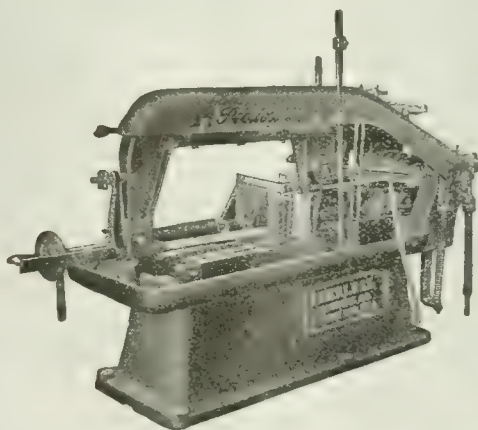
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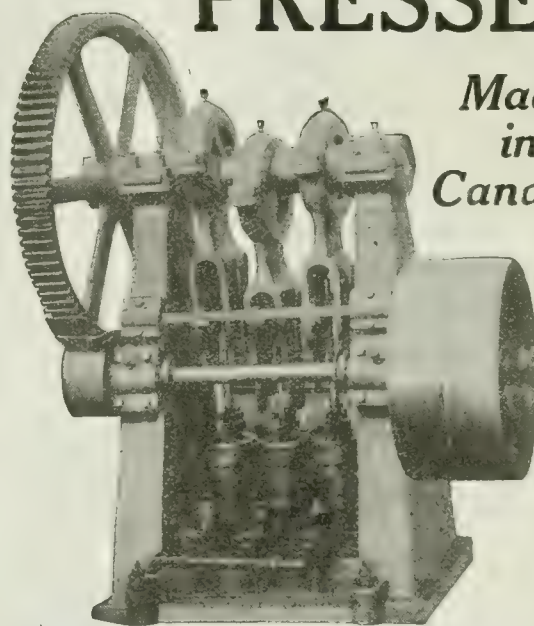
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West Tire Setter Co., Rochester, N.Y.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Brown, Rogers Co., Ltd., Hamilton, Canada.
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Can. Fairbanks-Morse Co., Montreal.
Consolidated Press Co., Hastings, Mich.
Ferracute Machine Co., Bridgeton, N.J.
Garlock-Walker Machinery Co., Toronto, Ont.
Hedraule Machy. Co., Ltd., Montreal, Que.
William R. Perrin, Ltd., Toronto.
Riverside Machinery Dept., Detroit, Mich.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, SPRING FOOT

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Brown, Rogers Co., Hamilton, Ont.
Consolidated Press Co., Hastings, Mich.
Toledo Machine & Tool Co., Toledo.
Williams & Wilson, Limited, Montreal, Que.

PRESSES, SCREW

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Bliss Co., E. W., Brooklyn, N.Y.
Ferracute Mach. Co., Bridgeton, N.J.
William R. Perrin, Ltd., Toronto.
Williams & Wilson, Limited, Montreal, Que.

PRESSES, TRIMMING

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Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.

Erie Foundry Co., Erie, Pa.
Ferracute Mach. Co., Bridgeton, N.J.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson, Limited, Montreal, Que.

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PROPELLERS

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PSYCHROMETERS, SLING

Taylor Instrument Co., Rochester, N.Y.

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American Pulley Co., Philadelphia.
Baird Machine Co., Bridgeport, Conn.
Bernard Industrial Co., Fortierville, Que.
Brown & Sharpe Mfg. Co., Providence, E.I.
Can. Fairbanks-Morse Co., Montreal.
Ford South Machine Co., Hamilton, Ont.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.
Positive Clutch & Pulley Works, Ltd., Toronto.
J. C. Wilson & Co., Belleville, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.
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Bernard Industrial Co., Fortierville, Que.
Can. Link-Belt Co., Toronto, Ont.
Carlyle Johnson Mach. Co., Manchester, Conn.
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Jones & Glasco, Montreal.
Johnson, Carlyle, Mach. Co., Manchester, Conn.
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American Pulley Co., Philadelphia, Pa.

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Darling Bros., Ltd., Montreal, Quebec.
Trahern Pump Co., Rockford, Ill.

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PUMPS, HIGH PRESSURE

William R. Perrin, Ltd., Toronto.

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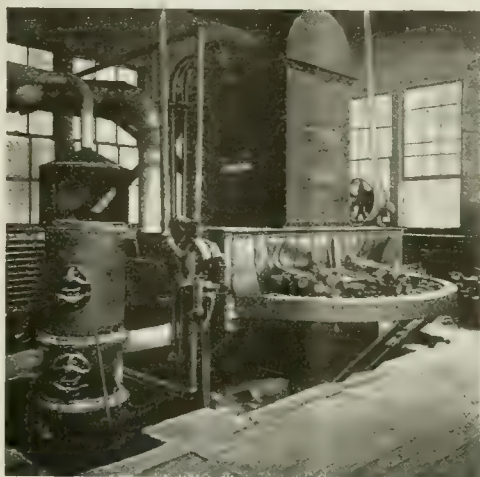
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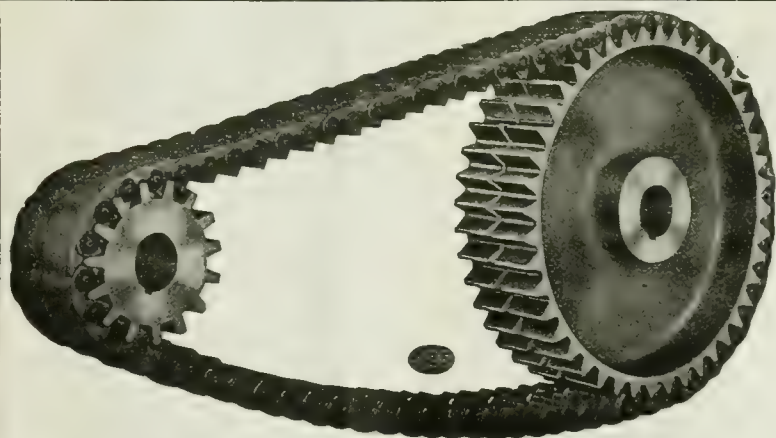
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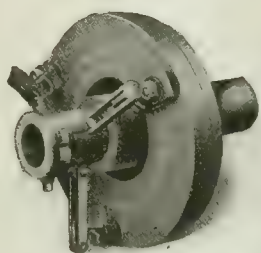
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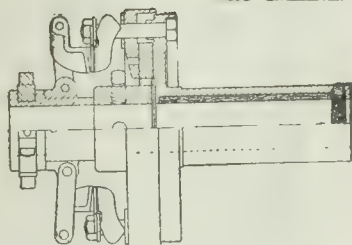
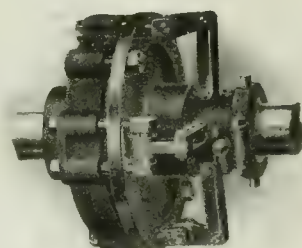
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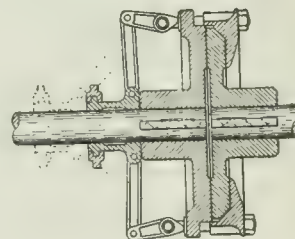


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CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper devoted to the machinery and manufacturing interests.

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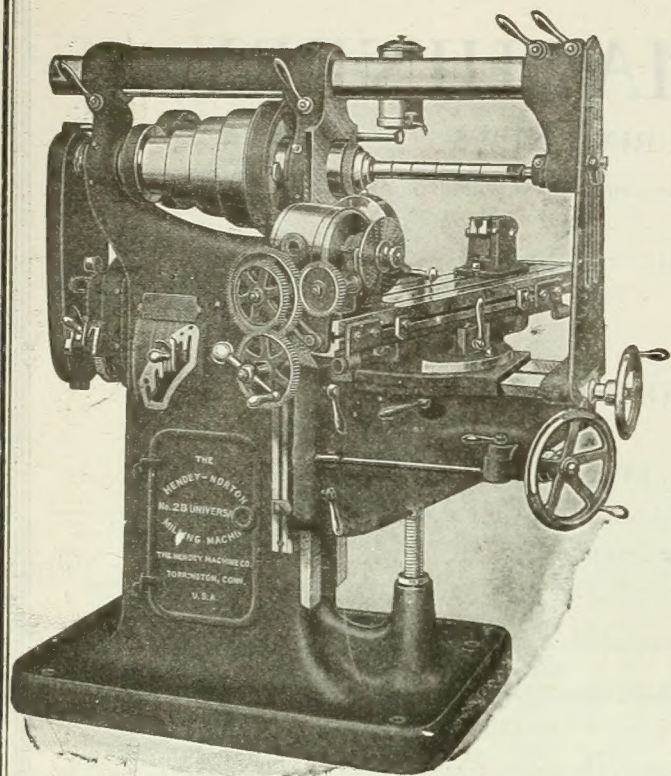
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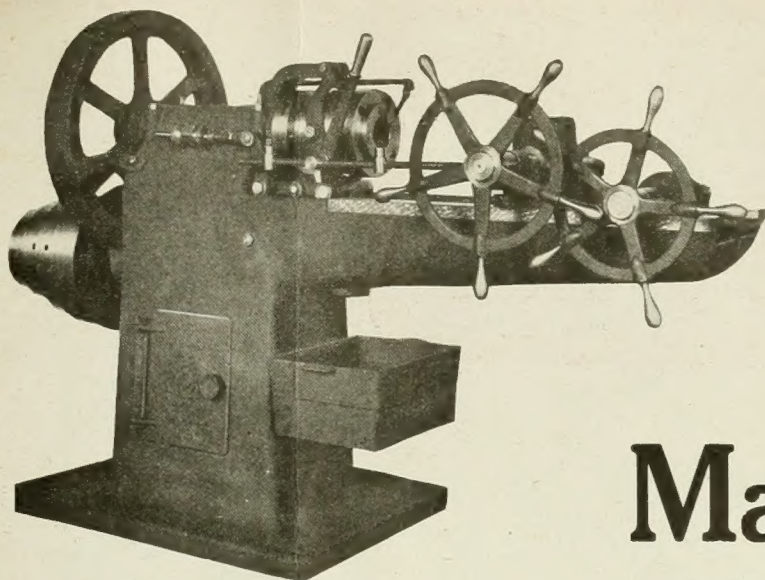
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